VOL. XXIV. Nº 12. DECEMBER 1939

MECCANO MAGAZINE



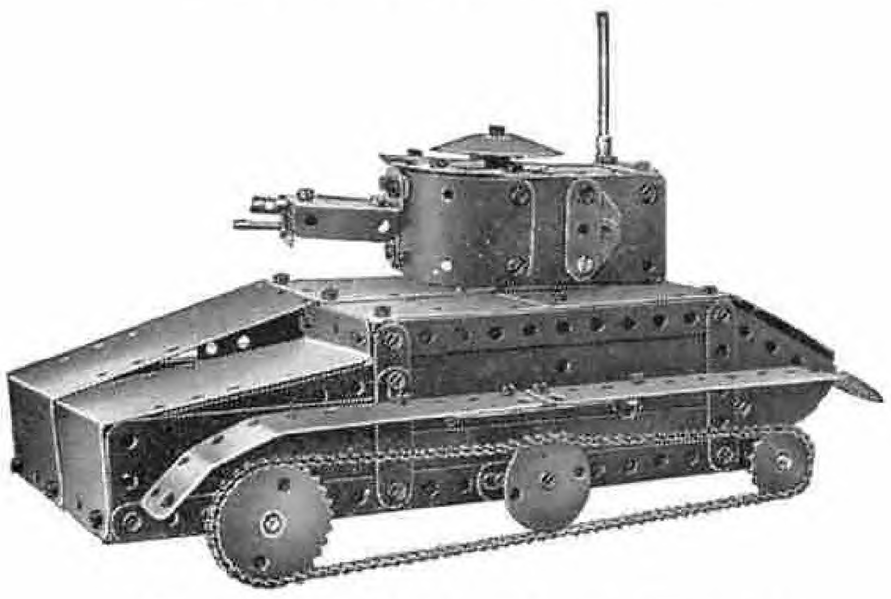
DROP FORGING

6D.

MECCANO



The above illustration shows the new Meccano Mechanised Army Outfit. This consists of parts specially designed to construct models of the British Mechanised Army. The parts are enamelled in Service green and black and are interchangeable.



Typical Light Tank, with swivelling turret

MECHANISED ARMY OUTFIT

The rapid development of tanks, anti-aircraft guns, and mechanical transport of all kinds has revolutionised the Army of to-day.

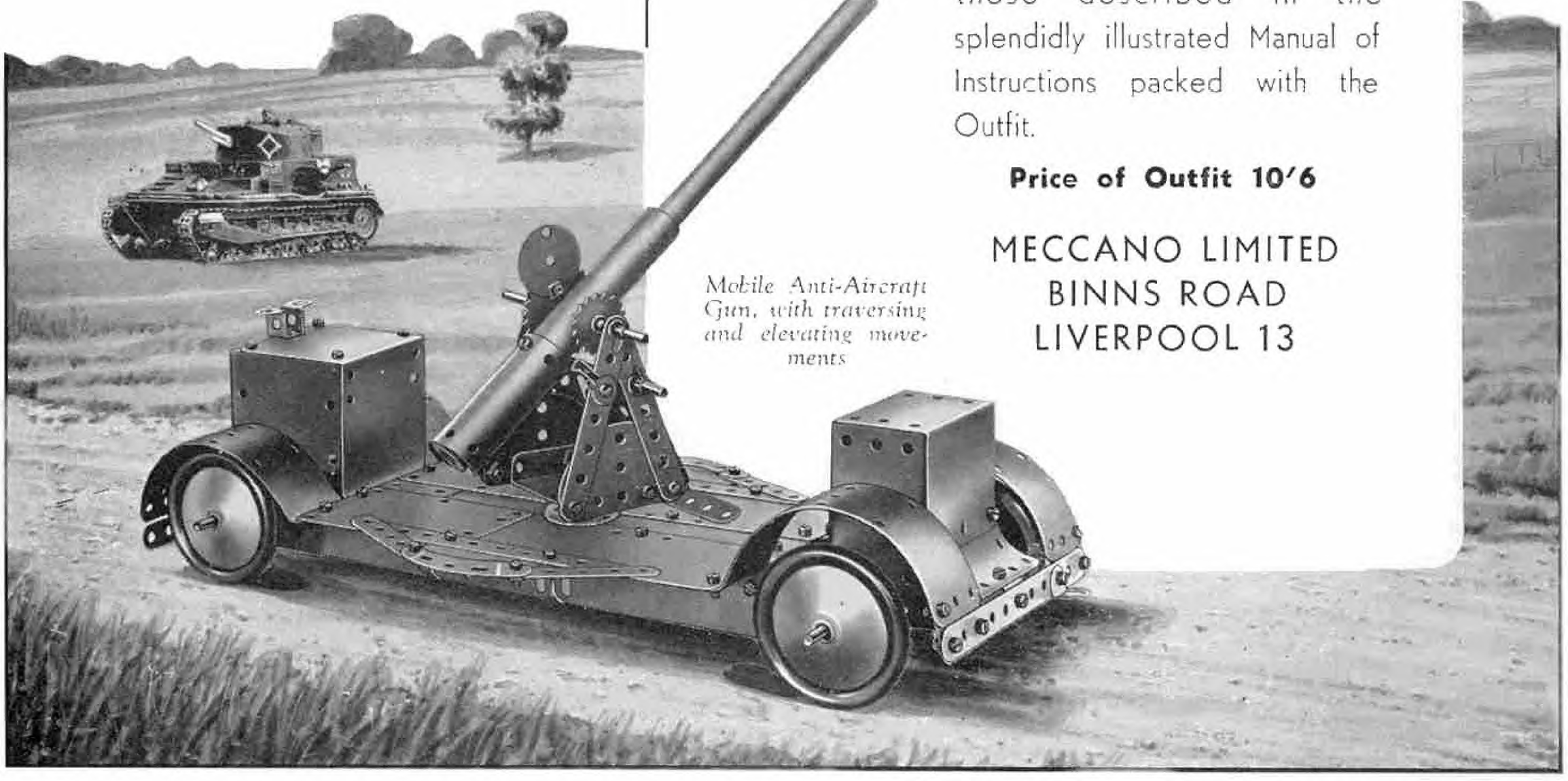
All boys are interested in the British Mechanised Units, and they will welcome the new Meccano Mechanised Army Outfit, with which can be built magnificent models of tanks, anti-aircraft and field guns, searchlights and transport vehicles, with a greater degree of realism than has ever before been possible.

The Outfit consists of a big assortment of specially designed parts, including Gun Barrels of different diameters, which can be used either singly or in combination.

The fine models shown in the accompanying illustrations are two of those described in the splendidly illustrated Manual of Instructions packed with the Outfit.

Price of Outfit 10'6

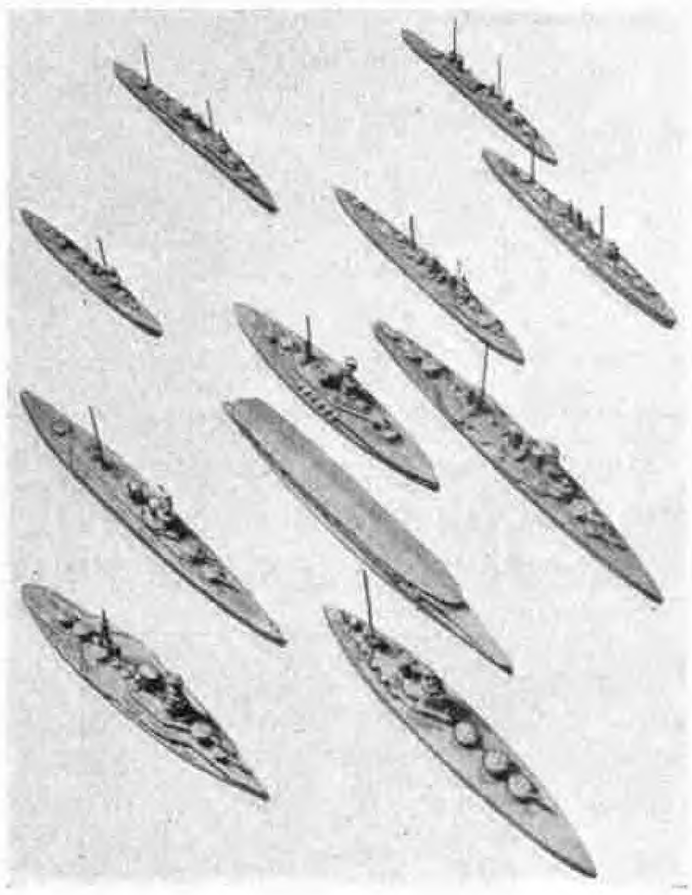
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BINNS ROAD
LIVERPOOL 13



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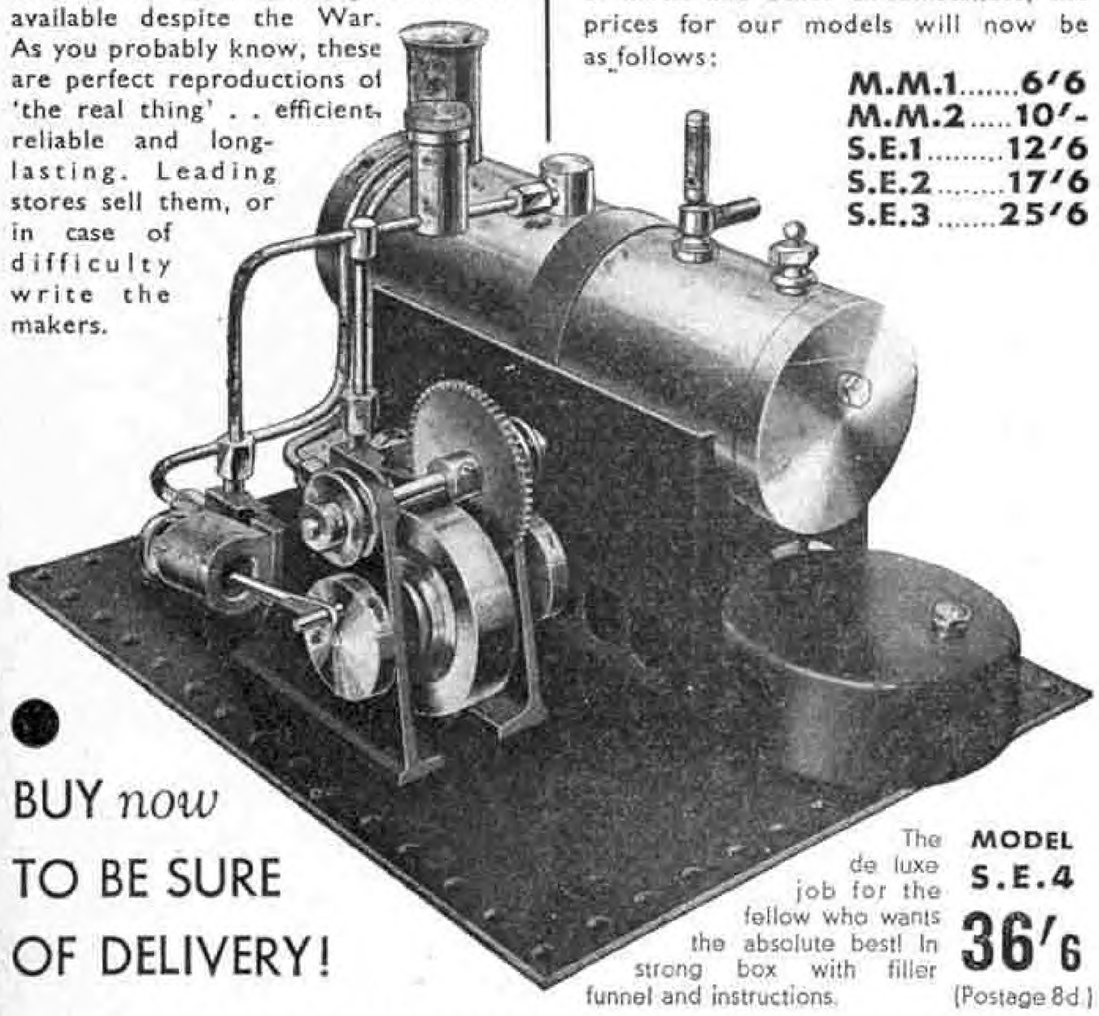
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Owing to the present increase in price of metal and other circumstances, the prices for our models will now be as follows:

M.M.1.....6'6
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S.E.1.....12'6
S.E.2.....17'6
S.E.3.....25'6



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FOG—WHEN THE RAYS OBTAINED, THROUGH BEING INFRA-RED, ARE FOG PENETRATIVE.

BAYONET CAPPED TRE VITA "TUBA" DYNAMO HEAD BULBS.
Regd. Design 828997.
Suitable Lucas or Miller 6v. 3W. Separate Bulb for Lucas 1.8W.
Silk Frosted **1/1½**. Clear **1/–**. (Specify Dynamo.)

M.E.S. CAPPED TRE VITA "TUBA" DYNAMO HEAD BULBS.
Suitable for 6v·5a. Separate Bulb for 6v·3a. and Lucifer 6v. 12P.
Silk Frosted **9d.** Clear **7½d.** (Specify Rating reqd.)

HEADLAMP BULBS FOR USE WITH RALEIGH DYNOHUBS.
The types listed are as at present fitted by The Raleigh Cycle Co. Ltd.
With Shouldered M.E.S. Caps and 18 mm. Balloons.

For the Raleigh 12v. Dynohubs ...	951 Silk Frosted	...	**1/1½**
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	234 Clear	...	**1/–**

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Ref. 31. 6v. 4.5w. Sur Vita Gas Filled, with 18 mm. Frosted Balloon and Shouldered M.E.S. Cap **1/1½**

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For Raleigh 12v. Dynohubs, or Bemo. Use Ref. 202 2·5v·25a. with 11½ mm. Ball Shaped Clear Balloon **7½d.**

For Raleigh 8v. Dynohubs ... Use Ref. 207 1·5v·15a. with 11½ mm. Ball Shaped Clear Balloon ... **7½d.**

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Send for Price Lists. Individual Bulbs Supplied. No Charge for Postage.

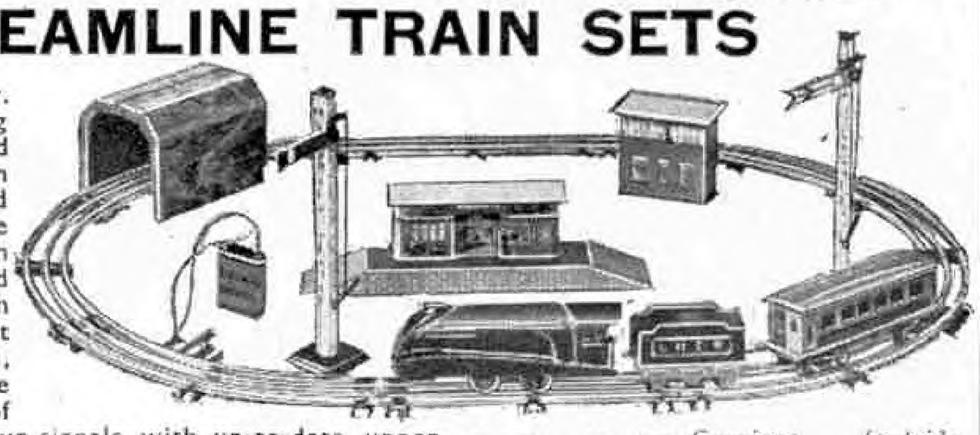
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A unique set for the money. Comprises: electric reversing locomotive, tender, and bogey wheeled Pullman coach. Enamelled blue and silver (L.N.E.R.). Remote control is by fibre switch (with forward, reverse, and stop lever), and fitted with flex to connect with pocket battery. Length of train, 20 ins. **In addition** the following wide range of accessories are included—two signals with up-to-date upper quadrants (home and distant), station, signal box, tunnel and oval track consisting of six curved and two straight electric rails, and battery.

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Originally 29/6



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An opportunity not to be missed. **15/-**

Please state Mains Voltage. Post 6d.

Special Projector Screen **5/3**
30 ft. Film **3/9**, 60 ft. **6/6**

Above are post extra if ordered separately.



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The finest value obtainable in popular priced boys' footballs. Best leather. Hand sewn, twelve panels. Supplied complete with lace and best quality red rubber bladder.

Match Size. **5/11**

Size 4, 4/9.
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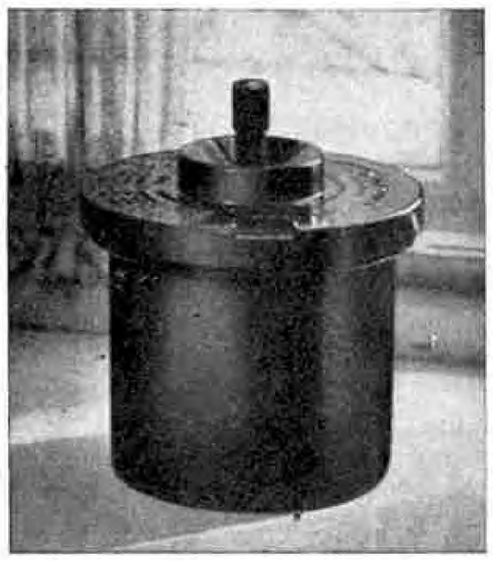
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18 exposures 35 mm. film. Requires only 10 to 18 oz. of solution.

Easy loading in the dark. Films can be developed, fixed and washed without removing from the tank.

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3-oz. bottle 2/– making 75 to 300 oz.
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Development Time Tables showing how long to leave the film in the solution for correct development enclosed with each bottle.

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The inevitable question crops up—what to give to friends, children or self?

Nothing could be more appreciated than a model construction kit (Aircraft, Ships or Railways), a coveted locomotive or some addition to a lay-out. A petrol engine or a much needed component—we have endless suggestions to make and invite you to inspect without obligation our very comprehensive stocks. CALL IN AT OUR SHOWROOMS AND SOLVE YOUR GIFT PROBLEMS!

BELOW we give you some idea of our range:

Scalecraft and Penguin Scale Solid Aircraft kits from **1/1½** to **29/–** each
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Treforrest (waterline Naval models), Studiette Galleon kits, Fleet miniature Galleon kits, Web Model Fitting Co., Stuart Turner Marine Engines.

AIRCRAFT

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All-Mains precision built 9·5 mm. Projector giving brilliant perfect pictures

Only 27/6 MAINS MODEL C4

Stage thrilling Movie Shows this Christmas with the new All-Mains Bingoscope. This beautifully-made, reliable Machine has all the essential features of projectors costing many pounds. Yet it is offered at an unheard of price—27/6, including resistance. Easy to run, giving brilliantly clear, flickerless movies, it's the one Xmas gift of which boys and girls never tire.

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A Bingoscope is the most popular "entertainer" for parties. Absolutely safe, because films are non-inflammable. Finest quality focussing lenses giving brilliant pictures of remarkable clarity.



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MICKEY MOUSE, STAN LAUREL, POPEYE, etc., etc.
A wonderful selection of films is available. All guaranteed non-flam. Cartoon and Comedy Subjects: 15 ft. **1/8** each; 30 ft. **3/9** each; 60 ft. **6/6** each.
Two types of containers are used for 30 ft. and 60 ft. films, the closed canister type (for Model B.2) and the open or type "O" for Models C.3 and C.4. *Each type of film should be stated on order*

Other Bingoscope Models:

C.3. Battery Projector **18/6** **B.2.** Battery Projector **10/6**

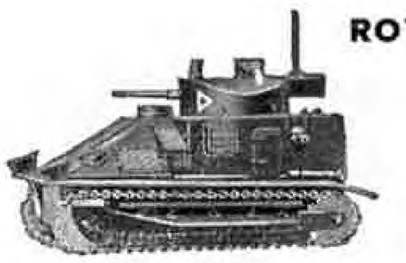
See them at all stores or write for Illustrated Leaflet to:
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START COLLECTING DINKY TOYS PERFECT SCALE MODELS

Nowadays everybody is interested in the Mechanised Units of the British Army, and among the most popular Dinky Toys models are the two Royal Tank Corps Sets, which have been great favourites since their introduction into the Dinky Toys range in 1937. They have recently been followed by an accurately modelled Mobile Anti-Aircraft Unit, an 18-pounder Quick-Firing Field Gun Unit and Royal Artillery Personnel.



ROYAL TANK CORPS MEDIUM TANK SET



151A



151D



150D



151C



151B

Dinky Toys No. 151

No. 151a	Medium Tank	each	1'9
No. 151b	Transport Wagon ...	,,	1'2
No. 151c	Cooker Trailer	,,	7d.
No. 151d	Water Tank Trailer ...	,,	5d.
No. 150d	Driver	,,	2d.

Price of complete set **4'-**

ROYAL TANK CORPS LIGHT TANK SET



152a



150d



152b



152c

Dinky Toys No. 152

No 152a	Light Tank ...	each 1'2	No. 152c	Austin Seven Car	each 5d.
No 152b	Reconnaissance Car	,, 1'2	No. 150d	Driver ...	,, 2d.

Price of complete set **2'11**

18-POUNDER QUICK-FIRING FIELD GUN UNIT



Dinky Toys No. 162

Comprises scale models of an 18-pounder Quick-Firing Field Gun, Trailer and "Light Dragon" Motor Tractor. Price **2'6** per set

ROYAL TANK CORPS PERSONNEL



150a



150b



150c



150e

Dinky Toys No. 150

No. 150a	Officer	each	2½d.
No. 150b	Private, sitting (two in set)	,,	2d.
No. 150c	Private, standing (two in set) ...	,,	2d.
No. 150e	N.C.O.	,,	2d.

Price of complete set **1'-**

MOBILE ANTI-AIRCRAFT UNIT



Dinky Toys No. 161

Comprises scale models of a Quick-firing Anti-aircraft Gun mounted on a mobile platform and a Searchlight mounted on a lorry. Both Gun and Searchlight have elevating and traversing movements. Price **3'6** per set



ROYAL ARTILLERY PERSONNEL



160A



160B



160C



160D

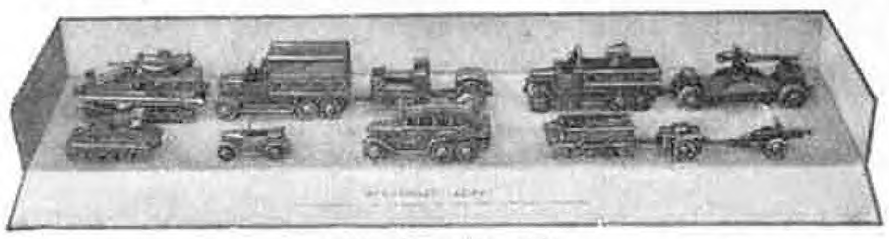
Dinky Toys No. 160

For use with Dinky Toys No. 161, Mobile Anti-Aircraft Unit and No. 162, 18-pounder Quick-Firing Field Gun Unit.

No. 160a	N.C.O.	each	2½d.
No. 160b	Gunner, sitting (two in set)	,,	2d.
No. 160c	Gunlayer	,,	2d.
No. 160d	Gunner, standing (two in set)	,,	2d.

Price of complete set **1'-**

MECHANISED ARMY



Dinky Toys No. 156

This fine set contains the principal units of a modern mechanised army. It includes the following items:

Royal Tank Corps Medium Tank Set (Dinky Toys No. 151) without driver.
Royal Tank Corps Light Tank Set (Dinky Toys No. 152) without driver.
Mobile Anti-Aircraft Unit (Dinky Toys No. 161).
18-Pounder Quick-Firing Field Gun Unit (Dinky Toys No. 162).

Price **12'6**

NOTICE OF REVISED PRICES

Owing to rising costs of production, it has been found necessary to increase the prices of all Dinky Toys from 15th September 1939. A new price list is now ready. Ask your dealer for a copy.

A FASCINATING COLLECTING HOBBY

DINKY TOYS

OVER 300 VARIETIES

EMPIRE FLYING BOAT



Dinky Toys No. 60r

Scale models of the famous Imperial Airways Liners. Twelve models available, named *"Caledonia," "Cambria," "Canopus," "Corsair," "Cordella," "Camilla," "Capella," "Ceres," "Clio," "Calypso," "Corinna,"* and *"Cheviot."*

Price **1/2** each

ATLANTIC FLYING BOAT

Dinky Toys No. 60x

Similar in type to Empire Flying Boat (No. 60r). Assorted colours, names and registrations.

Price **1/2** each

ARMSTRONG WHITWORTH "ENSIGN" AIR LINER



Dinky Toys No. 62p

Scale model of the largest British air liner. Six models available, named *"Ensign," "Elsinore," "Explorer," "Echo," "Ettrick"* and *"Elysian."* Price **1/3** each

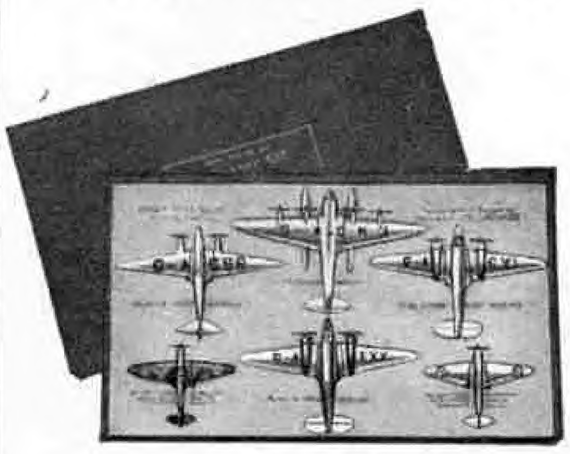
BRITISH 40-SEATER AIR LINER

Dinky Toys No. 62x

Similar in type to the Armstrong Whitworth "Ensign" air liner. Assorted colours.

Price **1/3** each

PRESENTATION AEROPLANE SET



Dinky Toys No. 64

This Aeroplane Set, in presentation box, consists of one each of the following Dinky Toys:

No. 60g D.H. "Comet" Aeroplane
No. 62h Hawker "Hurricane" Single-Seater Fighter (Camouflaged)
No. 62k The King's Aeroplane—Airspeed "Envoy"
No. 62m Airspeed "Envoy" Monoplane
No. 62s Hawker "Hurricane" Single-Seater Fighter (Aluminium Finish)
No. 63b Seaplane "Mercury"

Price **4/-**

NEW THIS MONTH

GARDNER'S M.G. RECORD CAR



Dinky Toys No. 23p

Announced in our September issue, but production unavoidably suspended until this month.

A scale model of the car in which Major A. T. G. Gardner, in May 1939, set up new world speed records for the kilometre and flying mile for cars up to 1,100 c.c., and for the flying kilometre, mile and five kilometres for cars up to 1,500 c.c. Price **1/-** each

SEARCHLIGHT LORRY



Dinky Toys No. 22s

A fine model of a four-wheeled motor lorry carrying a searchlight that can be elevated and traversed. It is enamelled in Service green.

Price **1/-** each

RACING CARS



23C



23D



23E

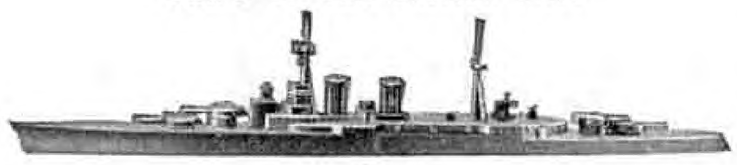
Dinky Toys No. 23

Assorted colours. Fitted with drivers and detachable rubber racing tyres.

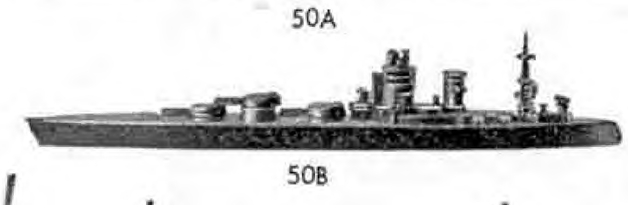
No. 23c Mercedes-Benz Racing Car ... ... each **10d.**
No. 23d Auto-Union Racing Car ... ... „ **10d.**
No. 23e "Speed of the Wind" Racing Car ... ... „ **10d.**

Price of complete set **2/3**

SHIPS OF THE BRITISH NAVY



50A



50B



50C



50E

No. 50a	Battle Cruiser "Hood"	each **7d.**
No. 50b	Battleships, "Nelson" Class (Two in set) ...	„ **6d.**
No. 50c	Cruiser "Effingham"	„ **5d.**
No. 50d	Cruiser "York"	„ **5d.**
No. 50e	Cruiser "Delhi"	„ **4d.**
No. 50f	Destroyers, "Broke" Class (Three in set) ...	„ **1½d.**
No. 50g	Submarine, "K" Class	„ **1½d.**
No. 50h	Destroyers, "Amazon" Class (Three in set)...	„ **1½d.**
No. 50k	Submarine, "X" Class	„ **1½d.**

Price of complete set **3/6**

ARMSTRONG WHITWORTH "WHITLEY" BOMBER



Dinky Toys No. 60v

Scale model of "Whitley" long-range heavy bomber adopted by the R.A.F.

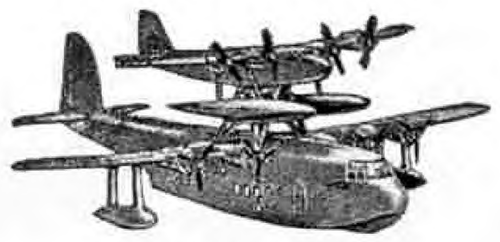
Price **11d.** each

ARMSTRONG WHITWORTH "WHITLEY" BOMBER (Camouflaged)

Dinky Toys No. 62t

Similar to Dinky Toys No. 60v but with Air Ministry camouflage. Price **1/-** each

MAYO COMPOSITE AIRCRAFT



Dinky Toys No. 63

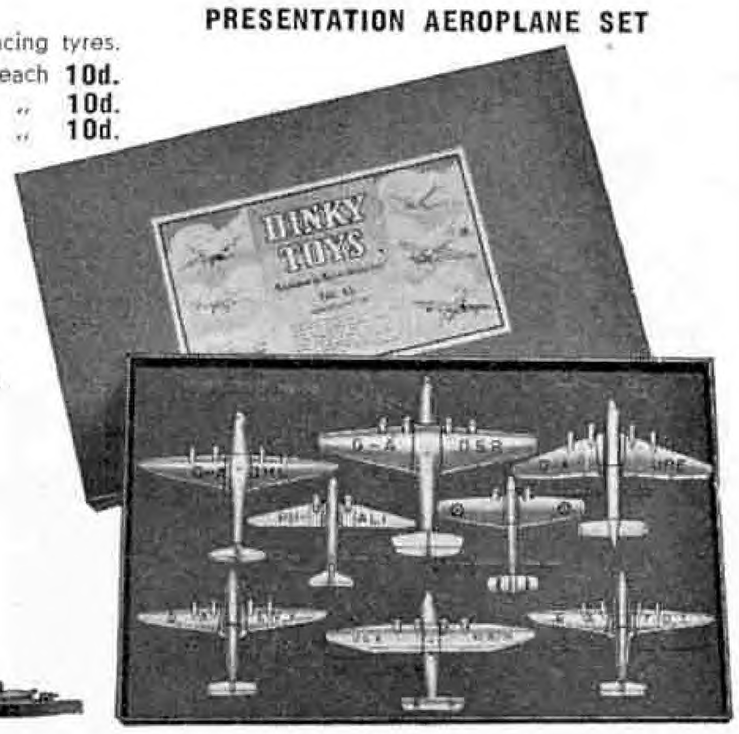
Scale model of the Mayo Composite Aircraft.

Price **2/4** each

The components of the above can be purchased separately.

No. 63a Flying Boat *"Maia"* ... each **1/6**
No. 63b Seaplane *"Mercury"* ... „ **11d.**

PRESENTATION AEROPLANE SET



Dinky Toys No. 65

This Aeroplane Set, in presentation box, consists of the following Dinky Toys:

No. 60r Empire Flying Boat
No. 60t Douglas DC-3 Air Liner
No. 60v Armstrong Whitworth "Whitley" Bomber
No. 60w "Clipper III" Flying Boat
No. 62n Junkers Ju 90 Air Liner
No. 62p Armstrong Whitworth "Ensign" Air Liner
No. 62r De Havilland "Albatross" Air Liner
No. 62w Imperial Airways "Frobisher" Class Air Liner

Price **8/6**

MECCANO LIMITED — BINNS ROAD — LIVERPOOL 13

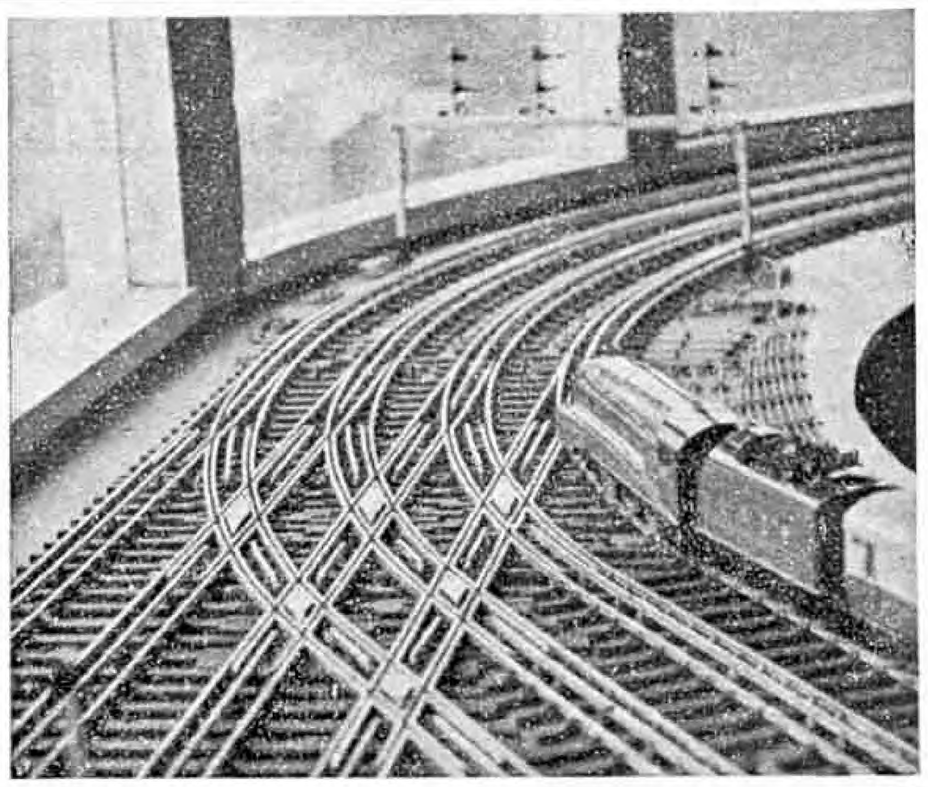
KEEP THOSE WHEELS REVOLVING!

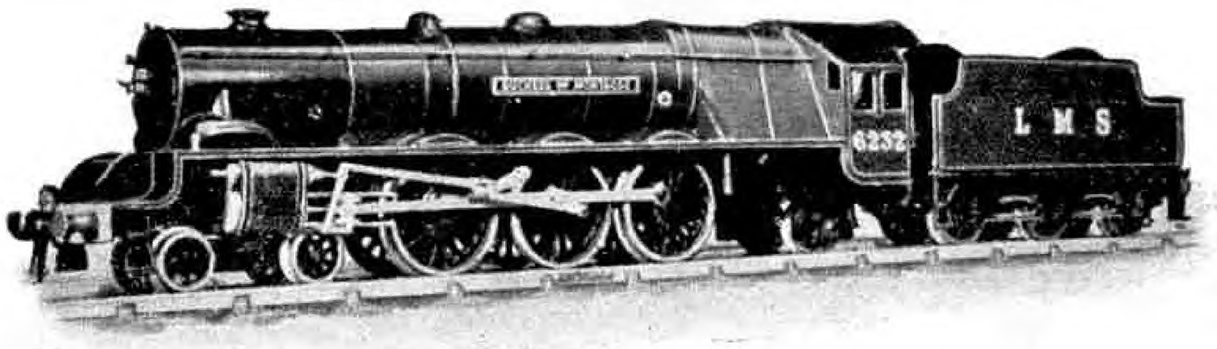
The Prime Minister, Mr. Neville Chamberlain, has said to all of us: "Keep the wheels of trade revolving."

In these times, when we carry gas masks by day and the "black-out" faces us at night, is the golden opportunity to keep those Model Railway Wheels revolving, and to keep Life in this most fascinating of indoor hobbies.

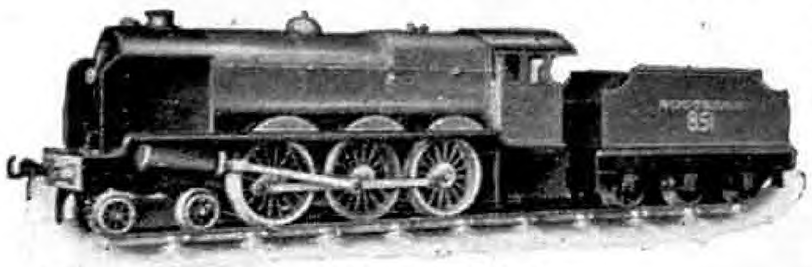
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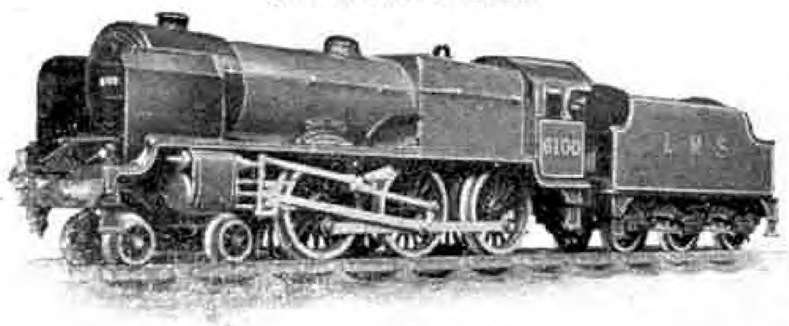
"DUCHESS OF MONTROSE"



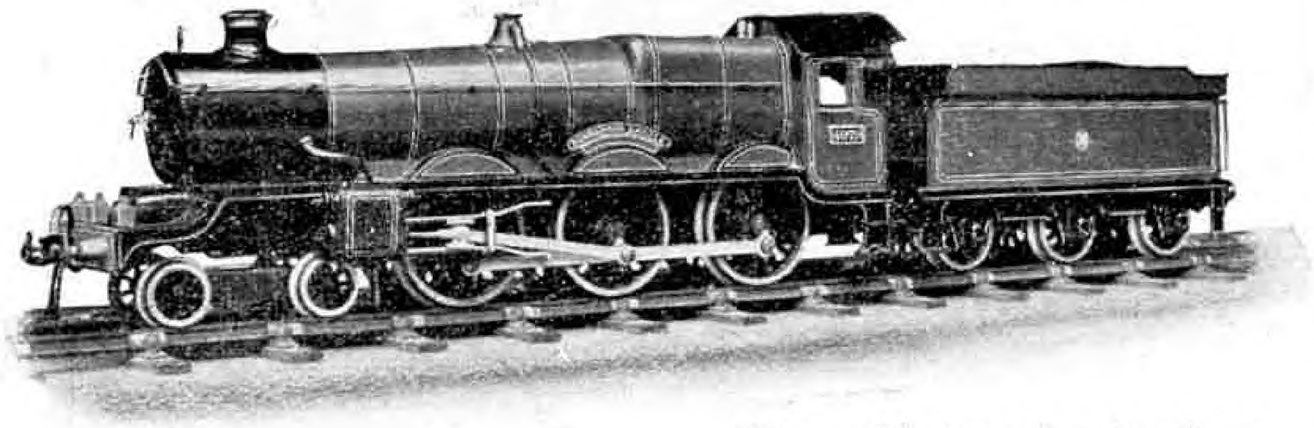
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"SIR NIGEL GRESLEY"



"ROYAL SCOT"



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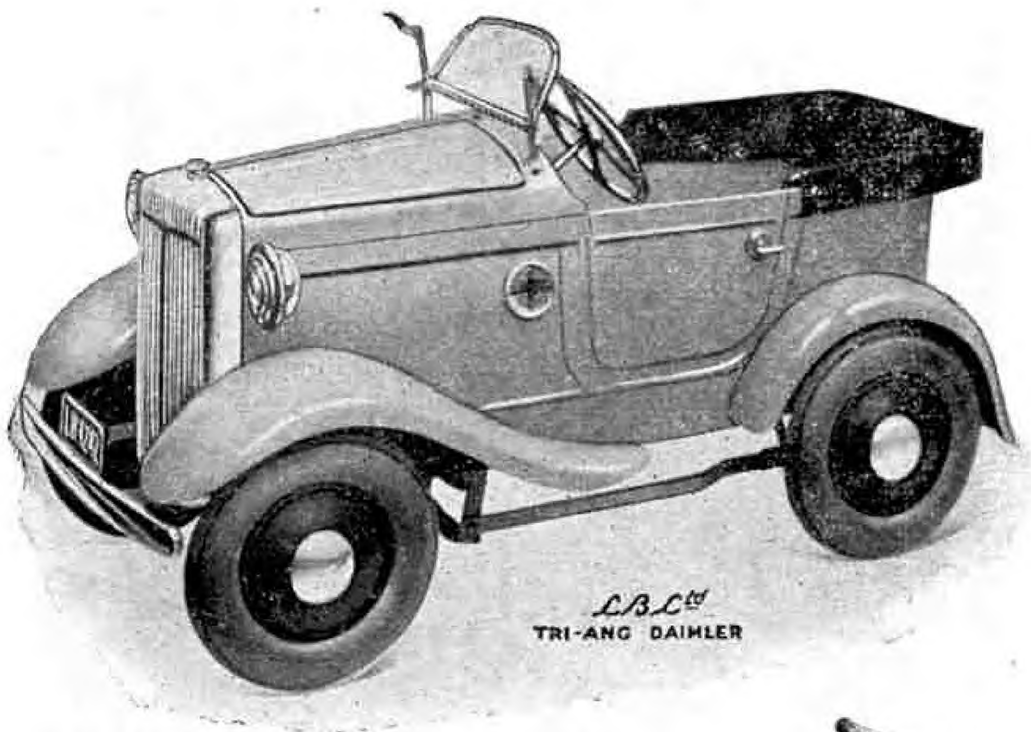
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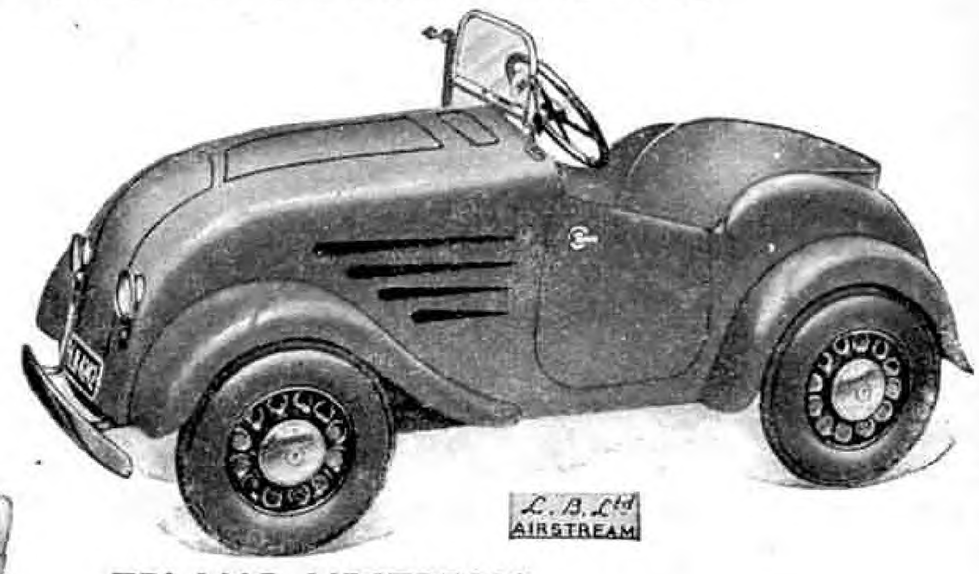
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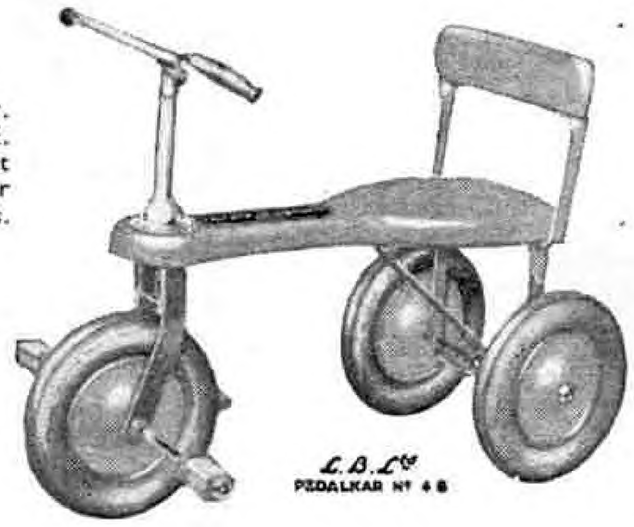


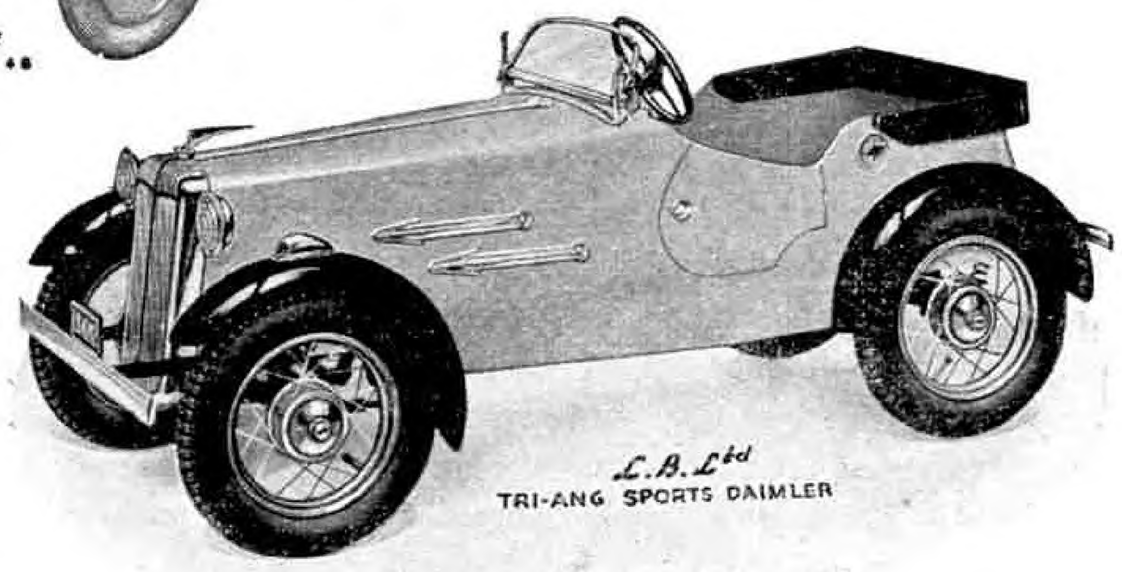
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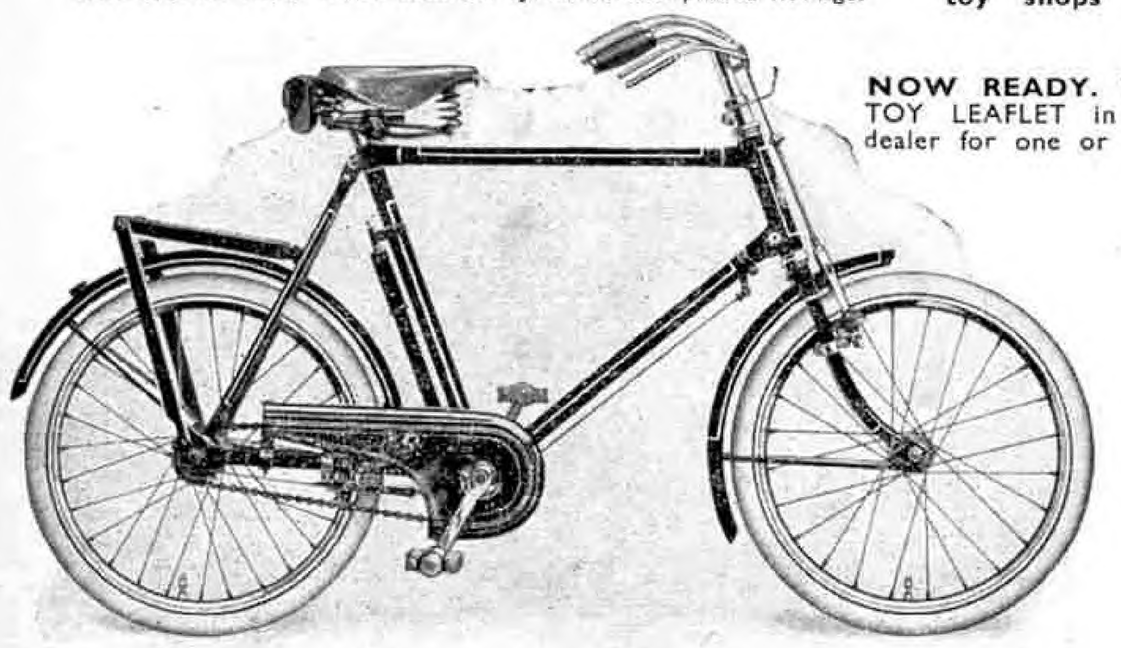
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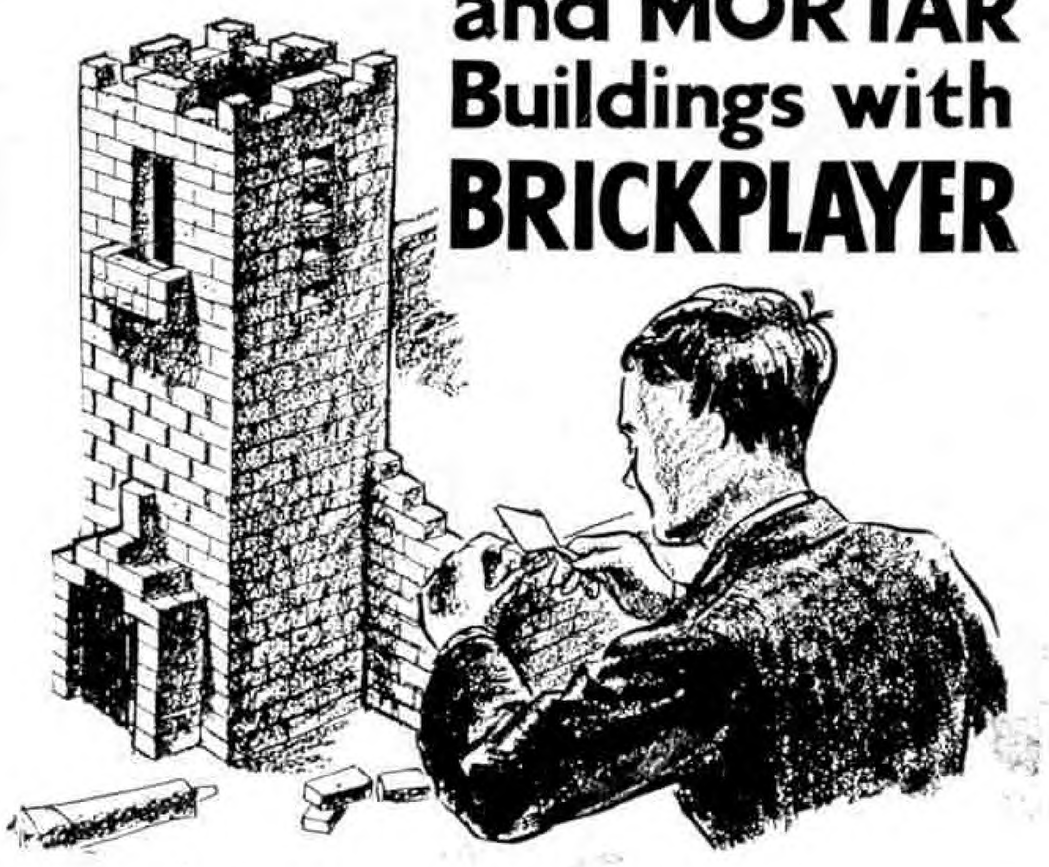
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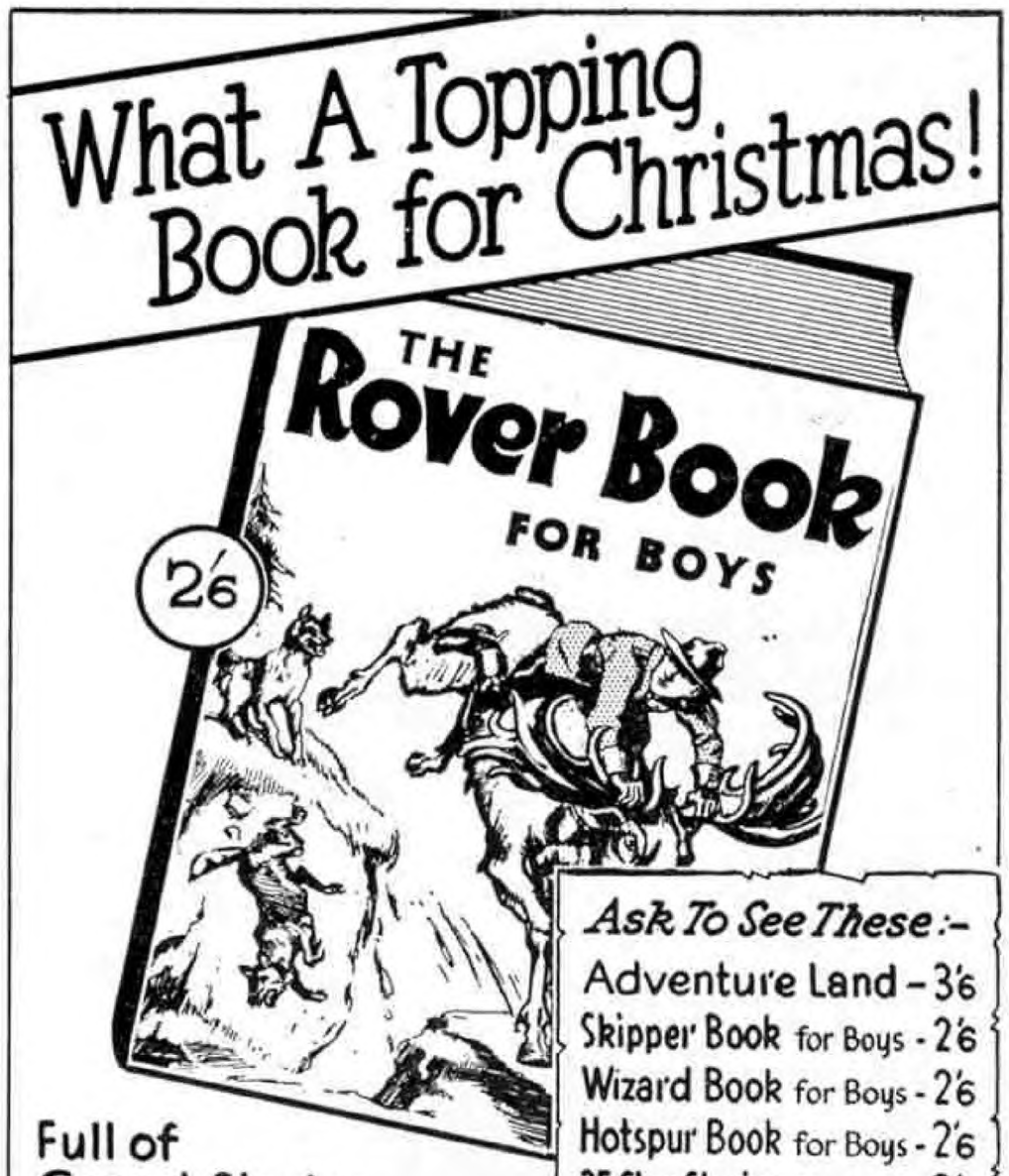
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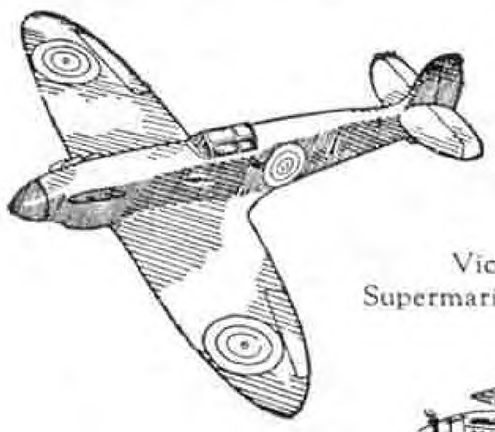


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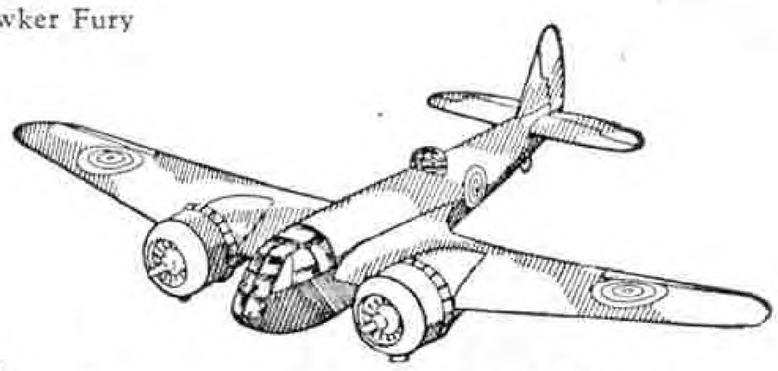
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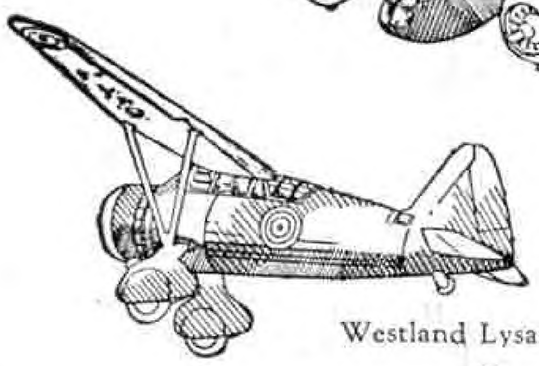
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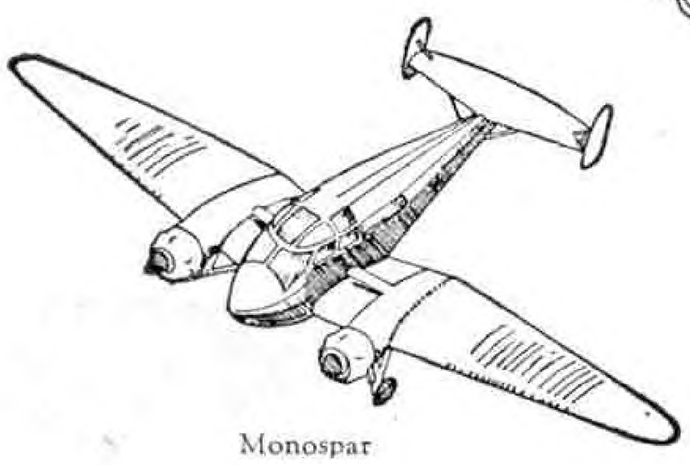
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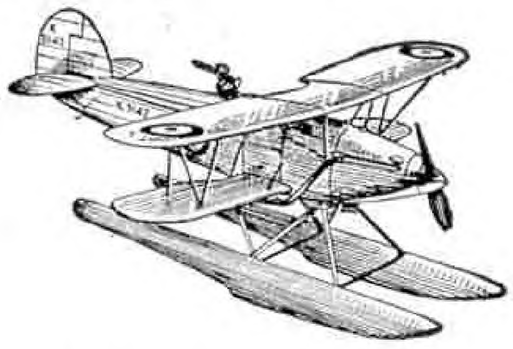
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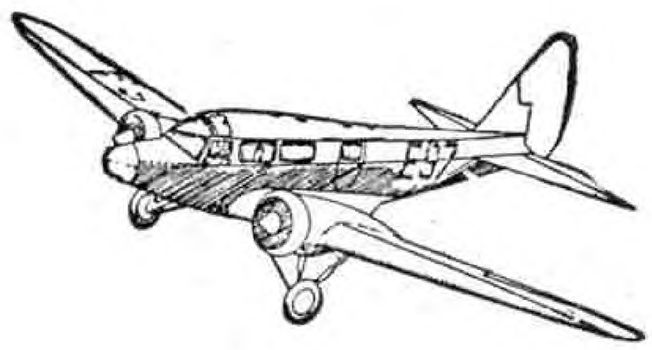
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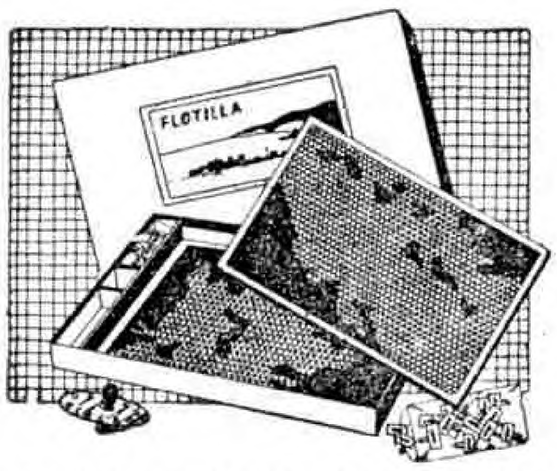
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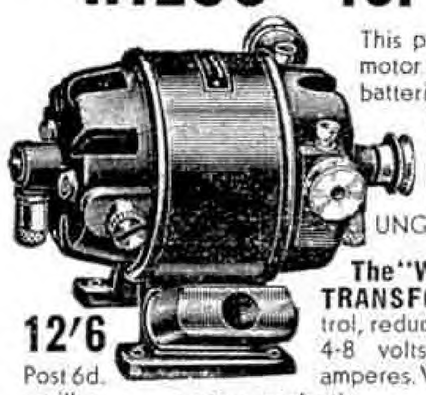
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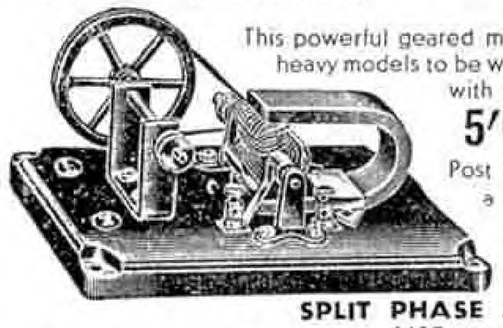
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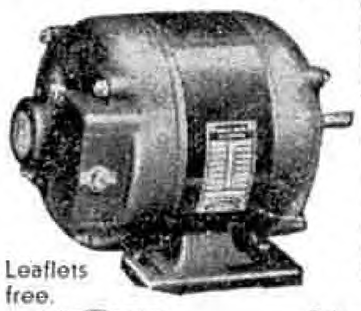
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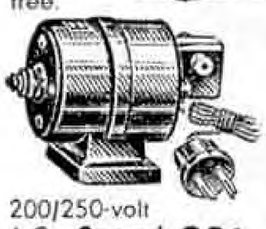
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Fitted with switch for 3/6 extra.

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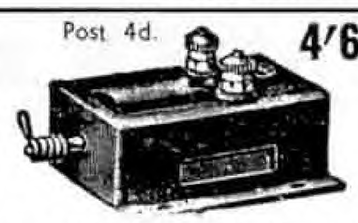
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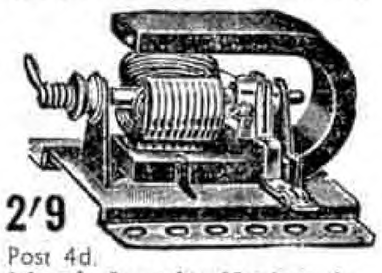


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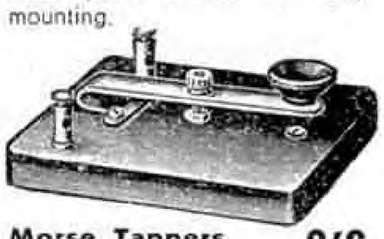


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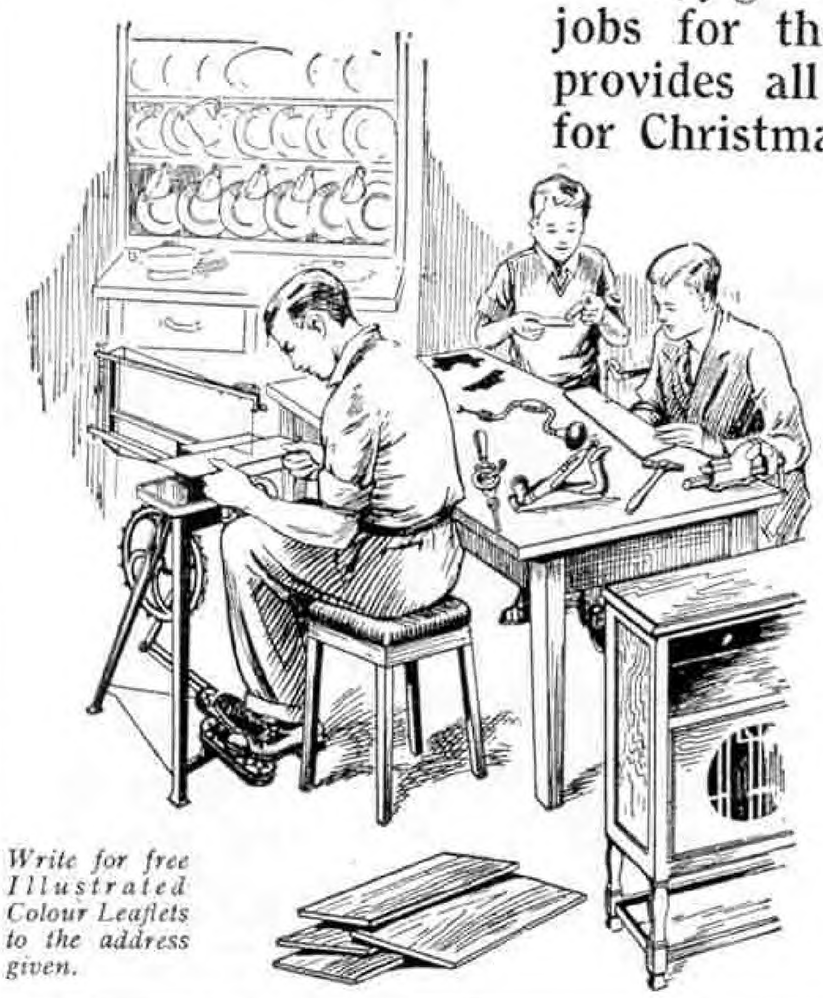
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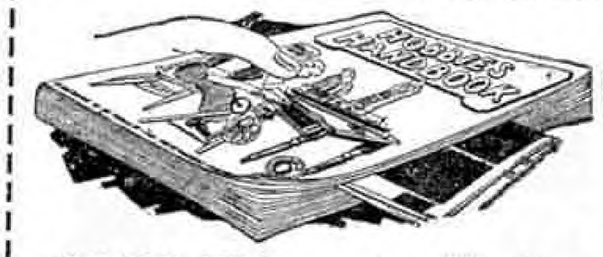
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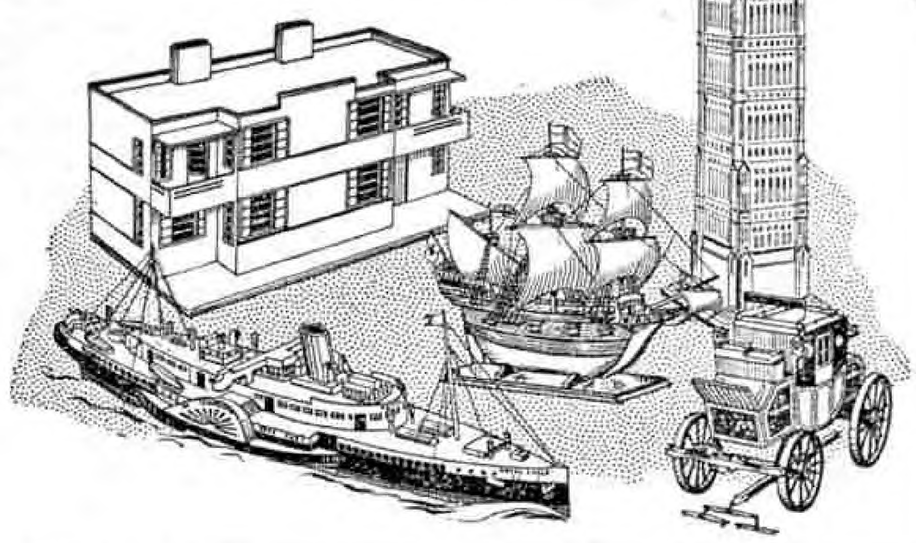
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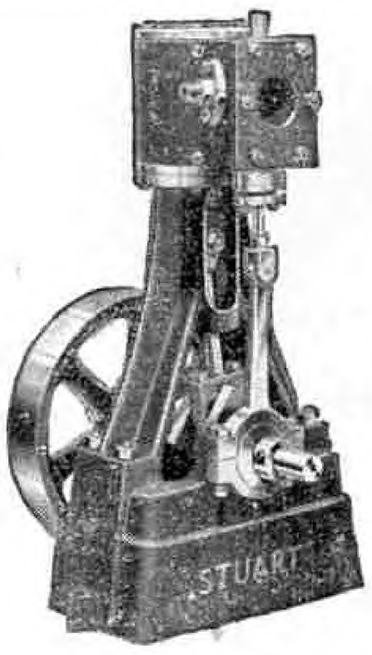
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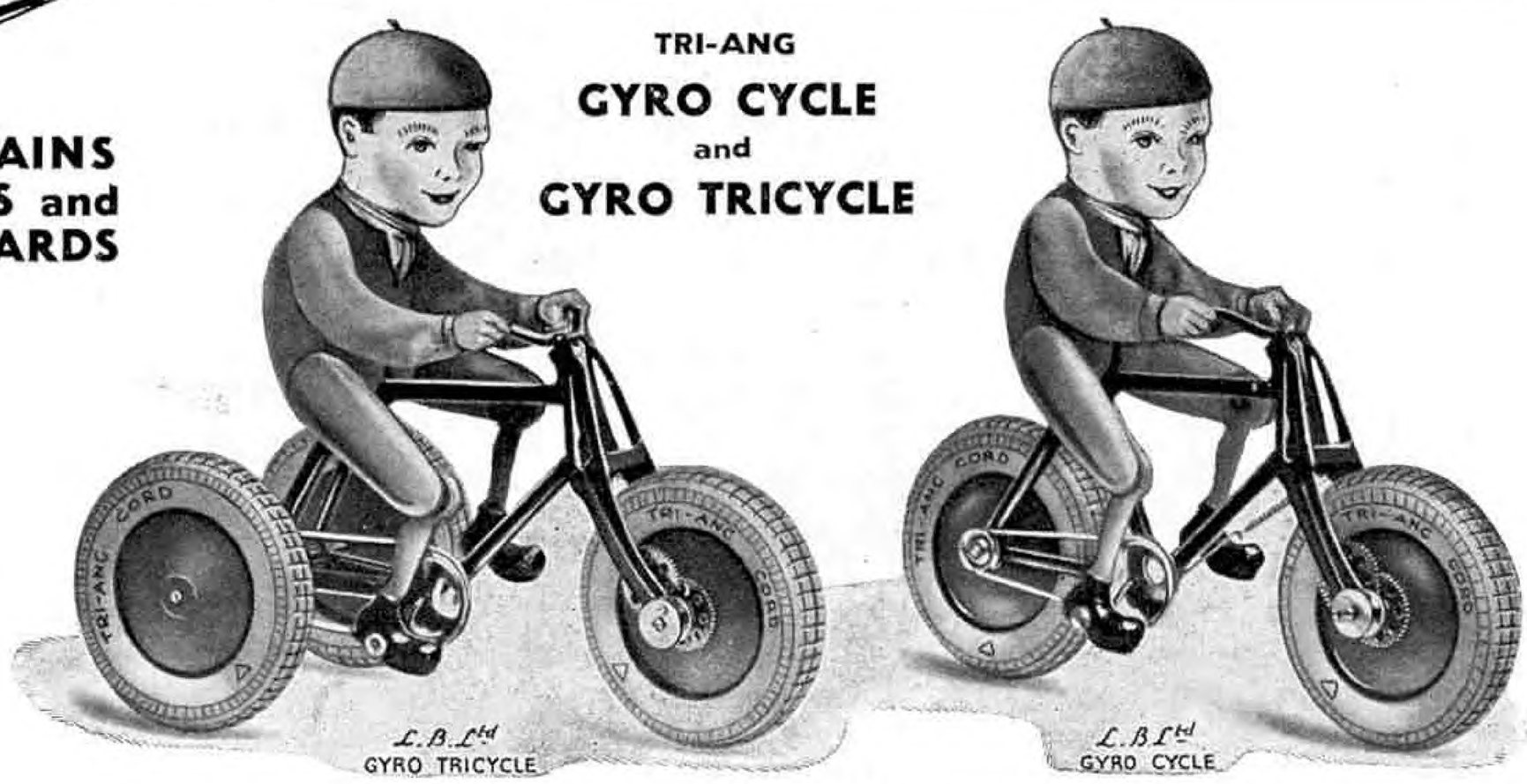
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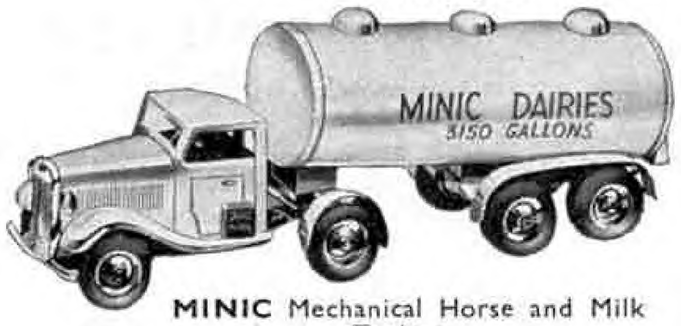


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NEXT MONTH: OUR ZOOS IN WAR TIME. PUBLISHING DATE: 1st JANUARY 1940

MECCANO MAGAZINE

Editorial Office:
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Vol. XXIV. No. 12
December 1939

With the Editor

Christmas Greetings

Once more my staff and I have the pleasure of sending our best wishes for Christmas to every reader of the *"Meccano Magazine."* This year it will be a strange Christmas in many ways, for there will be few homes in which family life has not been affected in some way by the war. In this country evacuation has split up thousands of families, and everywhere there are the gaps left as a result of the calls to military and other service. In spite of these troubles, which are not improved by the blackout, we shall all do our best to keep on smiling through, and to make Christmas a time of happiness and good-will. At any rate I know that every reader will do his bit in this direction. The war may drag on for a while, but we shall win.

It would be a mockery to wish a Merry Christmas to the vast number of boys in Europe who are suffering so terribly from the crimes of the madman who is at the head of Nazi Germany; but I should like every reader to join me for a moment on Christmas morning in thinking with sympathy of these poor boys, and in making a resolve that, when the opportunity arrives, we will do our utmost to bring back happiness into their lives.

"M.M." Fund for the R.A.F.

I have received recently many letters suggesting that *"M.M."* readers might combine to do something to make matters more cheerful for members of the Fighting Forces. I have thought about this carefully, and have decided that an *"M.M."* Fund would be a splendid thing. For many years the magazine has been in close touch with the growth of the Royal Air Force, and I think it would be most suitable if our Fund were to be devoted to the airmen who are looking after us in the air at home, on the Continent and overseas. The R.A.F. Comforts Committee tell me that portable radio sets are the outstanding demand of the R.A.F. to-day. They provide, for the men stationed at isolated units and outlying detachments, including the Observer Corps, their only opportunity of keeping in touch with current events. I propose to call our Fund *"The M.M. Wireless Fund for the R.A.F.,"* and I will give details next month.



Air Chief Marshal Sir Cyril L. N. Newall, G.C.B., C.M.G., C.B.E., A.M., Chief of the Air Staff.

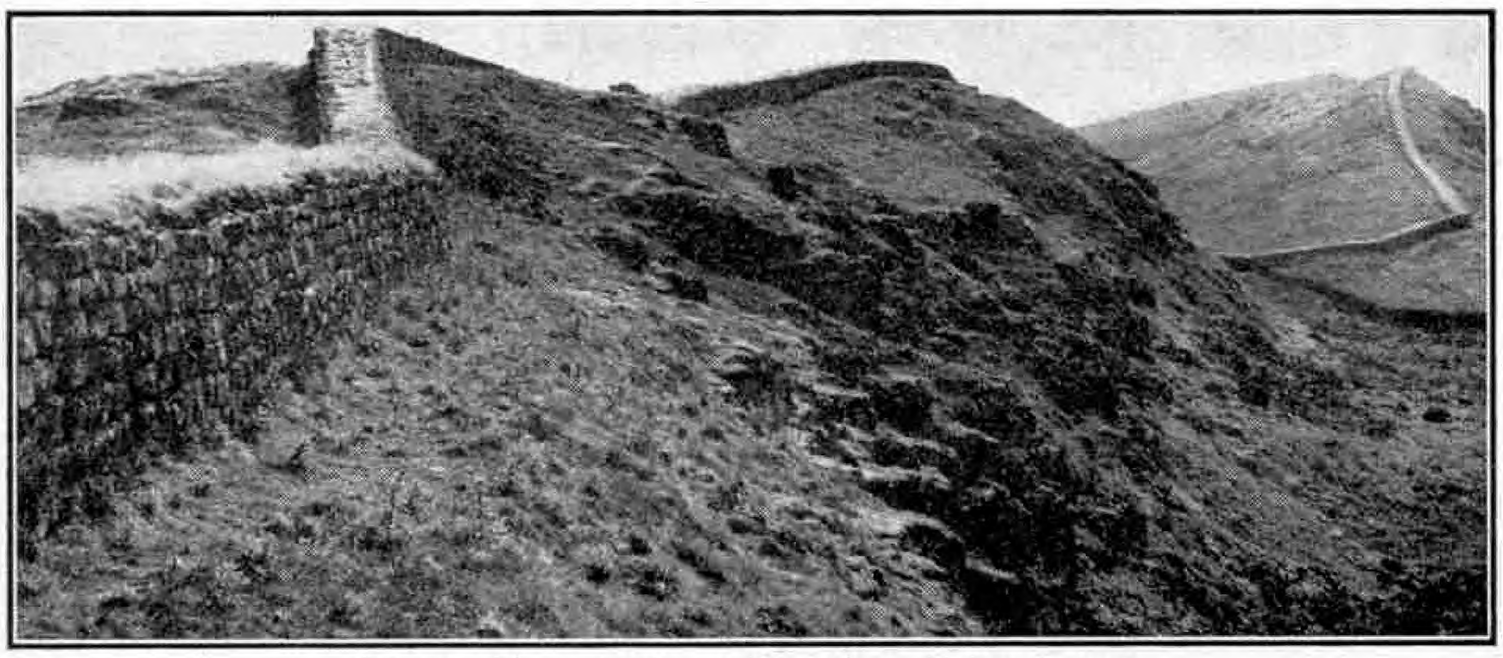
Leaders in the War
III. Sir Cyril Newall

Air Chief Marshal Sir Cyril Newall was born in 1886 in India. In 1906 he joined the Royal Warwickshire Regiment, and three years later transferred to the 2nd K.E.O. Gurka Rifles, Indian Army. In 1911 he learned to fly while on leave, and when the Great War broke out in 1914 he joined the Royal Flying Corps and went to France. Within a year he attained the rank of Major, and in command of No. 12 Squadron he took part in the Battle of Loos in September 1915. In the same year he was awarded the Albert Medal for the great courage he displayed in breaking into a blazing bomb store and putting out the flames. Later he received the C.M.G. and the C.B.E.

After the war Sir Cyril held various Royal Air Force appointments at home and abroad. In 1926 he was made Director of Operations and Intelligence, and Deputy Chief of the Air Staff, and in 1931 he became Air Officer commanding the Royal Air Force in the Middle East. Four years later he was appointed to the Air Council, and in September 1937 he became Chief of the Air Staff.

The "Maginot Line" of Roman Britain

By Sydney Moorhouse, F.R.G.S.



The great Roman Wall near Housesteads, Northumberland.

ALTHOUGH the Maginot Line of Eastern France is generally considered to be the finest example of an engineered fortification ever known, we in Britain have a fortified line that is no less wonderful when we consider the time and circumstances of its erection. It is the Roman Wall that was built across England from the mouth of the Tyne to that of the Solway, and is now known as Hadrian's Wall. It is probable, however, that only the forts and the Vallum were the work of that general, the actual Wall being built by one of his subsidiary commanders about 120 A.D. For years fierce fighting had taken place between the Roman occupiers of southern Britain and the barbarian Picts who lived to the north of the island, and the construction of the Wall marked an attempt to establish something in the way of a settled boundary between the two. It will thus be realised that its chief purpose was to check the raids of the tribesmen of Caledonia.

Excavation and intensive research work have established that the Wall, with its chain of forts, mile-castles and turrets, extended for a length of 73 miles from sea to sea, and that it took some five years to complete. The labour was supplied by men from the three legions stationed in Britain at that time—the Second Augusta, whose headquarters were at Caerleon-on-Usk in South Wales, the Sixth Victrix of York, and the Twentieth Valeria Victrix of Chester.

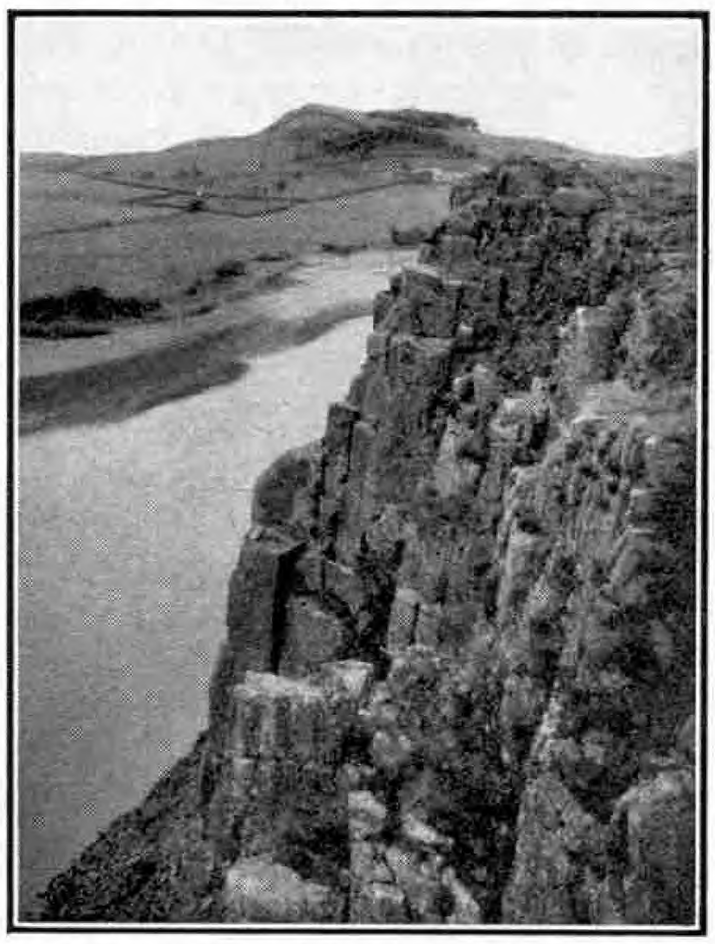
Originally the actual Wall had a height of at least 15 ft. or 20 ft., and a uniform width of some 9 ft. for the whole length of its course. To-day, however, the eastern and western extremities of the great barrier of stone have disappeared entirely, or have been covered by roads constructed during the last two or three centuries. The best-preserved sections lie between Greenhead, some 12 miles east of Carlisle, and Chollerford, in the valley of the North Tyne and about six miles north-west of Hexham. In places, particularly near to the villages mentioned, only the line of the Wall is visible above the ground; but in the centre there is a magnificent stretch, varying in height from 4 ft. to 8 ft., and faced with cubes of stones, which pursues a snake-like course across the heights.

No matter how prosaic-minded we are, there is no escaping the strange feeling of awe and wonder that is ours when we see those courses of masonry for the first time. My own introduction took place on a wild winter's day some years ago. Cold rain poured mercilessly down, and on either hand the leagues of bleak Northumbrian moorland, dappled with snow, faded gradually into grey horizons. Even the cheerlessness of the scene, however, could not destroy the glamour and romance that hovered around. As I tramped along on the very crest of the Wall, I found myself summoning up mental pictures of the troops of the Roman Empire stationed here, summer and winter alike, to keep watch over the fertile valleys to the South; and I realised that for centuries this bleak outpost had protected the grandeur that was Rome against the ravages of a barbaric foe.

There are other things on this Roman "Maginot Line" besides the actual Wall. So far as the composition of the ground made it possible, special watch-towers, or "mile-castles," were built at distances of a Roman mile, that is, 1,600 yds. apart. These were quadrangular buildings, some 50 ft. to 60 ft. in breadth and 65 ft. to 75 ft. in length, and each was designed for the accommodation of about 50 men. Usually they were placed immediately within the Wall itself, that structure serving as their north wall. There is a particularly fine example to be seen west of the camp at Housesteads.

One must not confuse these watch-towers with the forts that served as permanent quarters for the troops garrisoned at the Wall, and of which several examples may be seen. In his "*Handbook of the Roman Wall*," the late Collingwood Bruce tells us: "Nearly all the forts conform accurately to the standard Roman pattern; rectangular in form, though rounded at the corners, and surrounded by a stone wall with an earth rampart piled against its inner face and ditches, normally two or more, outside it."

At Chollerford is the well-preserved camp of Chesters (Cilurnam), which was the largest on the Wall and served as the headquarters



Another view of the Wall, with the cliff of the Whin Sill, looking east.

of a cohort, or *ala*, of Asturian cavalry. The camp, which covers an area of some 4½ acres, is open to the public, and there we can see the ruins of the various barrack rooms, courtyards and colonnades, as well as the regimental chapel from where a stairway led down to the underground strong room in which the pay chest was kept. The commandant's house, elaborately heated by a hypocaust, can be readily recognised, and beside the Tyne stand the remains of the regimental bath-house. On the opposite side of the river is the abutment of the Roman bridge that crossed at this point, and after a spell of dry weather three stone piers can often be seen above the level of the water.

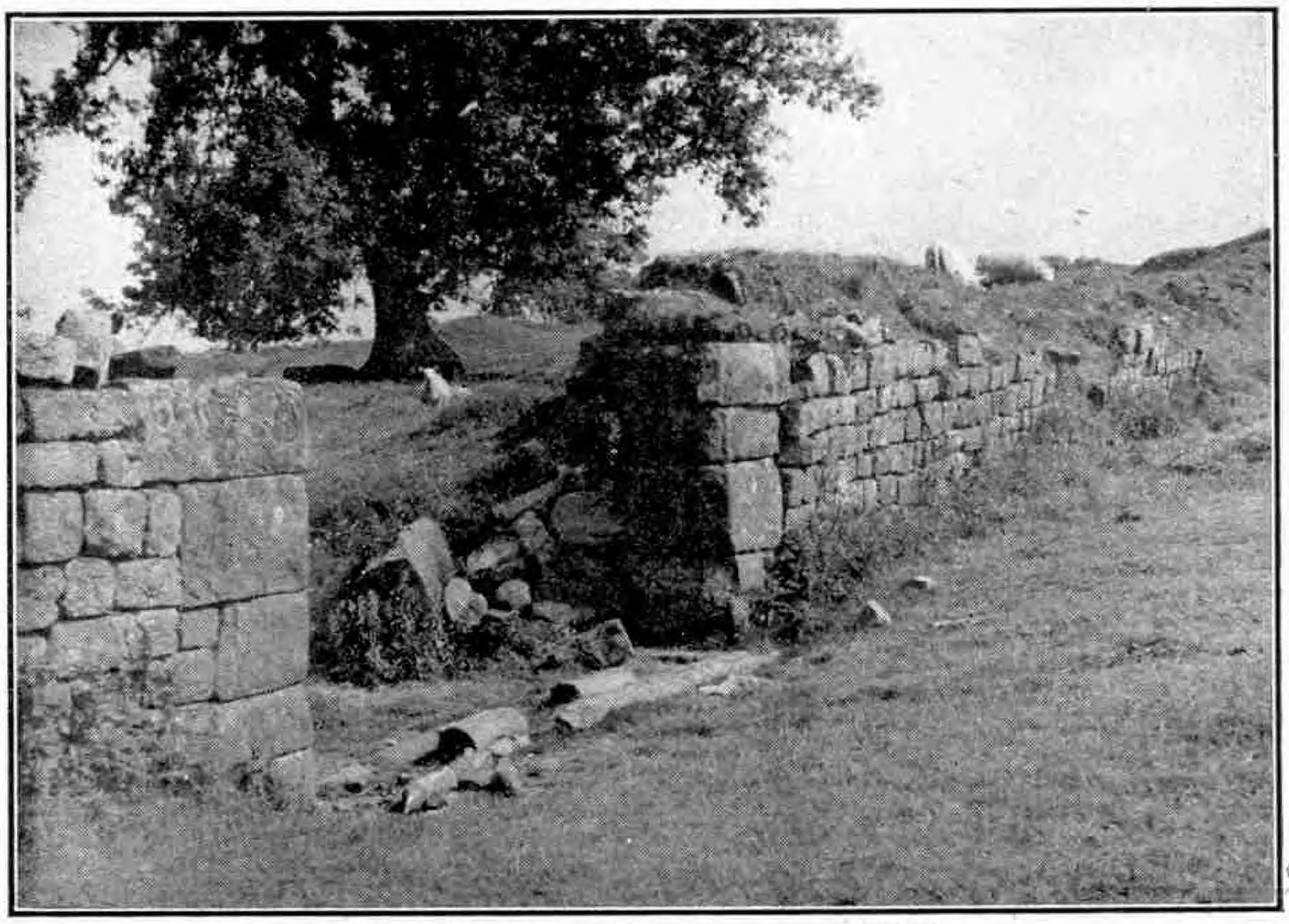
In the adjoining Clayton Memorial Museum is a fine collection of inscribed stones and jewellery, as well as a reproduction of a bronze tablet that served as the "discharge certificate" of a time-expired legionary.

About eight miles west of Chollerford is another finely preserved camp. This is now known as Housesteads, the Roman Borcovicium, and is under the care of the National Trust. Borcovicium was the headquarters of the First Cohort of the Tungrians, who came from Tungres, in Belgium; and the remains of the 10 long narrow barracks in which the thousand soldiers were housed can still be seen. There are, of course, other relics of buildings used for both domestic and military purposes, as well as the foundations of two granaries, the floors of which were raised in order to keep the grain dry. One of the most interesting features of Housesteads is the south gateway, where the actual pivot holes of the gates are still in position; and in the centre is the stone against which the doors closed. On each side of this stone are grooves worn out of the solid rock by the Roman vehicles, 1,700 or 1,800 years ago.

A little to the west of the fort itself is the site of the underground temple of Mithras, and when excavation work was being carried out in this vicinity some years ago the skeletons of a man and a woman were found under the floor of a building. Between the man's ribs was a broken sword and, as the Roman laws forbade any burials within the camps themselves, it is generally believed that the two people were murdered here and their bodies hidden away by the unknown assassin.

There are of course the remains of several other forts to be seen along the line of the Roman Wall, but the two described are by far the most interesting.

So far I have dealt only with the Wall itself and its series of forts and mile-castles, but there are other features of importance, which formed an integral part of the general scheme of fortification. These include two deep fosses running along both the north and south sides of the Wall, the first being known as "The Ditch" and the other as the "Vallum."



Birdoswald, west gate of Roman camp on the Wall.

Except in places where steep crags make any artificial protection unnecessary, the Ditch runs along the whole of the north side of the courses of masonry, and is a V-shaped cutting, about 35 ft. wide and 10 ft. deep. Even in places where the Wall has disappeared, particularly towards the eastern and western extremities, the Ditch remains, and when it crosses a track of flat or exposed country it will be found that the materials taken out of it were thrown up on its northern margin, so as to present an extra fortification.

There is an interesting stretch on what is known as Limestone Bank, where the Wall drops from the heights of the Whin Sill ridge towards the valley of the Tyne. Here the Ditch had to be cut out of the solid rock, and some of the excavated masses lie on the brink. One huge block still shows the wedge-holes where the diggers tried in vain to split it.

Many must wonder how the Romans succeeded in dislodging some of the blocks of the hard basalt; but if a study of the position of the various wedge-holes is made, it will be seen that the majority of these were inserted in the thin veins of quartz that intersect the native rock. It is presumed that wooden wedges were driven into these holes, after which water was poured on to them to make them expand and thus aid cleavage.

The Vallum, on the south side of the stone Wall, is a flat-bottomed trench some 30 ft. wide and 7 ft. deep, and once again the material excavated during its construction was piled up to form ramparts, about 6 ft. high and 20 ft. wide, on each side. Most authorities are agreed that the Vallum was constructed before the Wall itself, and originally served as a kind of concealed patrol-route between a series of frontier look-out posts and minor stations.

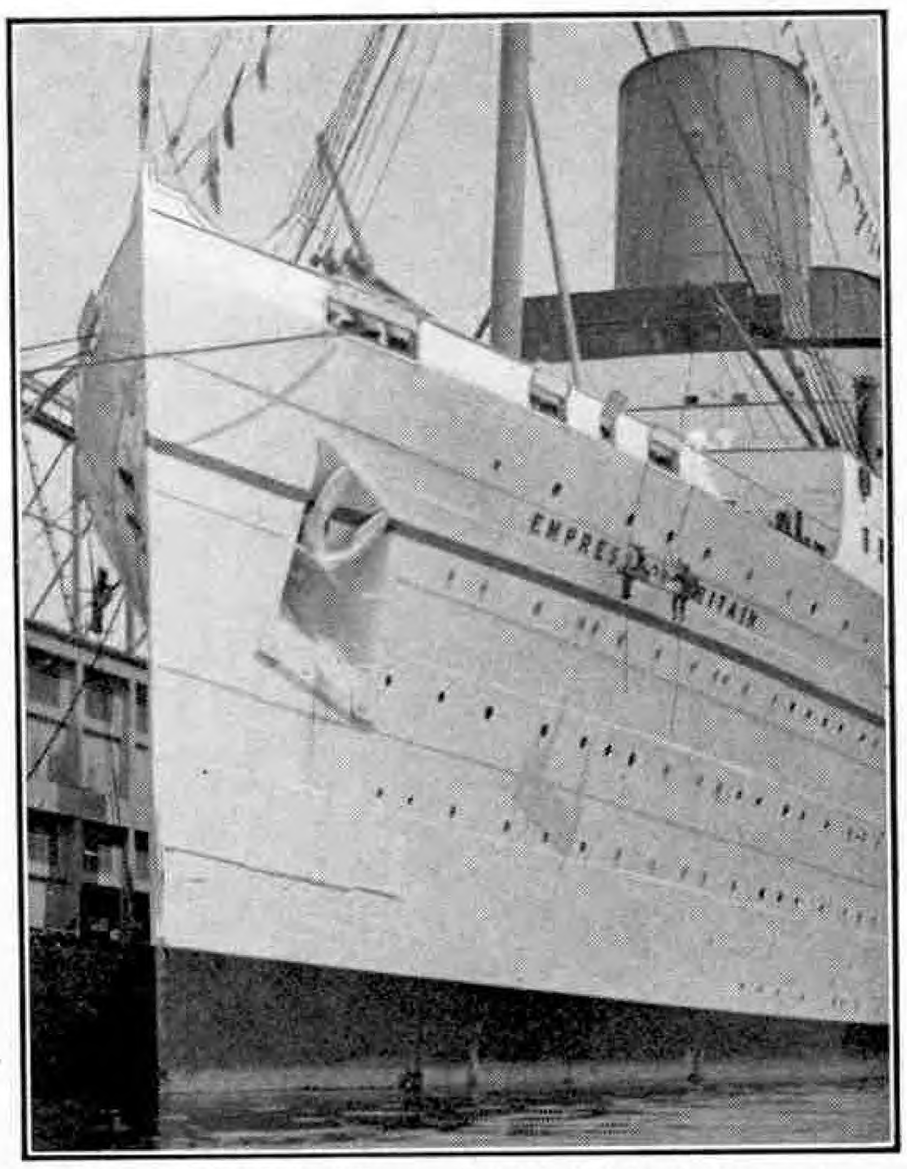
Such, in essence, is the construction of the "Maginot Line" of Roman Britain, a piece of ancient engineering that no one should fail to see for himself. The best way of visiting the Roman Wall is to tramp along the whole length from Greenhead to Chollerford. For those who prefer to travel by cycle I would point out that the Carlisle to Newcastle highway runs within easy distance of it for the greater portion of the way, and it is easy enough to leave the machine and inspect stretches of the masonry and defensive ditches at one's convenience.

The Story of Anchors

By David J. Murphy

AS is only natural with a seafaring nation, we have grafted on to our language a large number of nautical terms that are now in general use. Yet those who use them frequently do not always know anything about their origin, or the object from which those nautical terms are derived. This is particularly true of the anchor, which in the course of time has come to be regarded as the symbol of hope, trust and safety.

There are people who think that an anchor is merely a steel object that is lowered over a ship's side in the hope that it may hold her. As far as they are concerned, it is just a case of dropping the anchor and hoping for the best. In actual fact, however, the development, construction and use of anchors has now become a science, and the story of the anchor is the story of Britain's growth as a sea power.

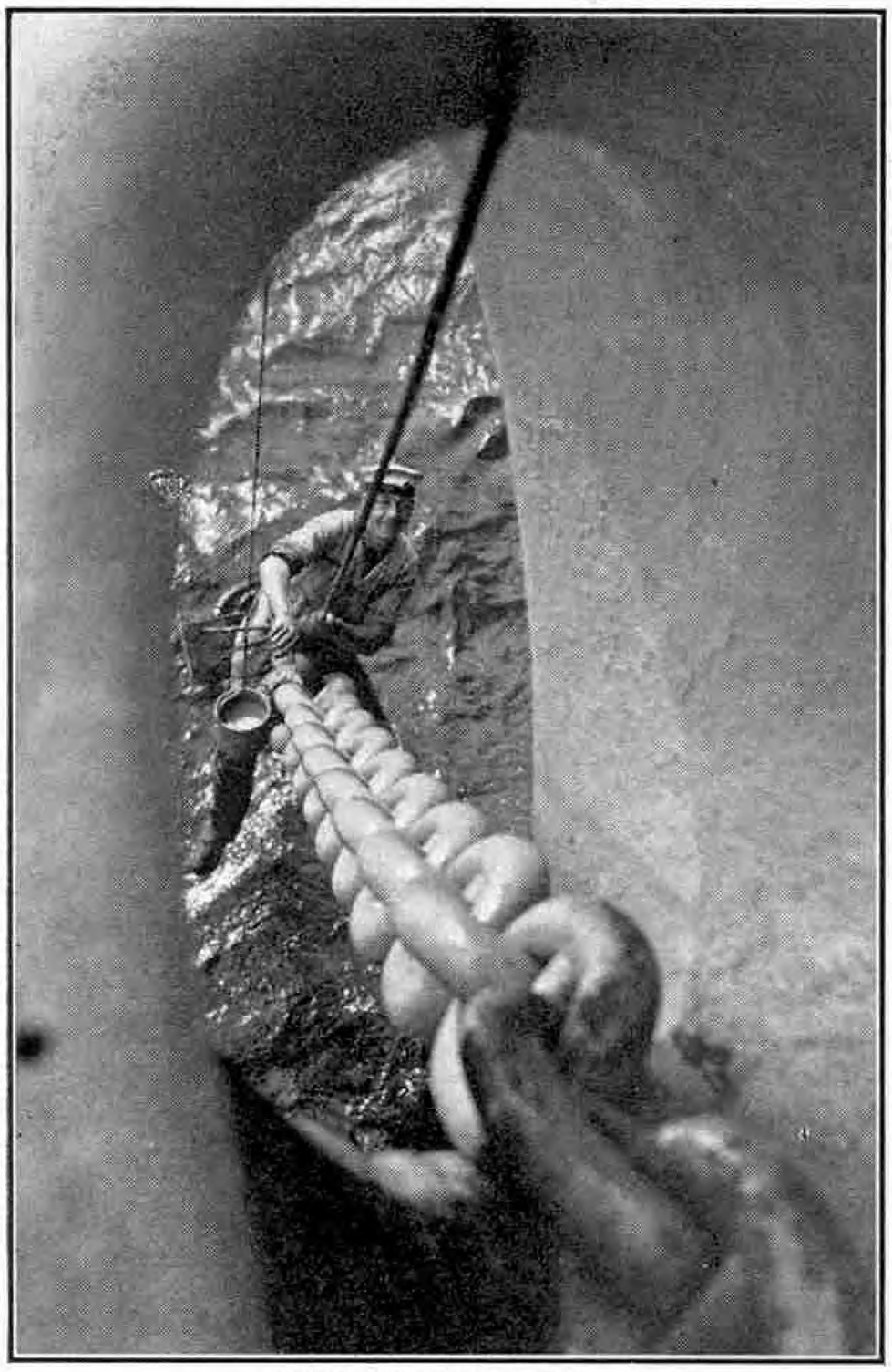


The anchor of the "Empress of Britain" in the hawsepipe.

A little more than a century ago, in 1838, a Mr. Porter took out a patent for an anchor that was to be the forerunner of all modern anchors. Prior to that time every anchor was made solid throughout, but Porter's patent introduced a movable part, the head that actually grips the sea bed. The invention was timely. Larger ships were being built, and the solid anchor, while serving its purpose, gave no guarantee that it would hold when lowered. It might take an immediate grip, or it might drag along the sea bed without any effect at all.

Now consider the modern anchor. At the top of it is the "shackle," to which the anchor cable is attached. Then comes the "shank," that long massive rod with which most of us are familiar; and at the end of the shank is the "crown," from which branch out the two "arms" with their pointed "flukes."

What happens when an anchor is let go? As soon as it touches the sea bed, the crown sinks into the mud and sand. Then, as the ship drifts away, the anchor begins to drag along the bottom, and the flukes, which pivot freely from the end of the shank, bury themselves deeper and deeper until they get a complete grip. This grip can only be broken when the ship moves ahead again, and the cable pulls the anchor out in the opposite direction. It can of course happen that the anchors will drag if a gale springs up and begins to drive the ship astern. This is an abnormal circumstance, however, against which the prudent shipmaster will always guard.



Painting the anchor cable.

The size and value of a large modern anchor may be gauged from the fact that the sheet anchor used on the *"Queen Mary"* weighs 14 tons, and its cost is estimated at more than the sum expended on a complete ship of Elizabethan days.

The sheet anchor is the largest of the several carried in every modern ship, and as a general rule it is used only in emergencies, when the other anchors have failed to hold. That is why the term "a sheet anchor" has come to mean something upon which we can rely in the last extremity.

In addition to a sheet anchor the *"Queen Mary"* carries two bower anchors, each weighing 10 tons. Most ships also carry a spare anchor aft, and this can be used for a number of purposes. For example, if a vessel were to run ashore bows on in a spot where tugs are not available, the spare anchor would be taken out in a boat to the deep water astern, and when fast would be used in attempts to haul the vessel clear.

Attached to a vessel's bow anchors are massive cables built to withstand enormous pressure. In the largest liners these cables are 165 fathoms, or 990 ft. long. Each link is about 2 ft. long and more than 4 in. thick, and the steel from which such cables are made is so tough that links will actually bend double without show-

ing signs of fracture.

All kinds of awkward problems can arise when dealing with anchors. In rivers or channels where tides are strong it is the usual practice to lower both bow anchors. When the ship swings with the flood and ebb the cables may begin to wind round one another, and after a long stay at anchor in such conditions the cables can become so entwined that they appear almost inseparable. The simplest way to deal with this is to obtain the services of a tug to heave the ship's stern round and round until all the turns in the cables are straightened out. But if no tug is available, then the crew can look forward to a long, back-breaking and ticklish job.

Every cable is made up of 15-fathom lengths, and these are joined up by shackles. When two anchor cables have to be separated by hand, one cable is eased off and the nearest shackle is unscrewed. The shackle is screwed up again when all the turns have been taken out. That is a simple description of the process, which in practice is much more complicated and difficult owing to the weight of the cables and other factors.

In old ships another problem can arise, and of this the writer has had bitter personal experience. Both anchors had been lowered in a great depth of water, but when they came to be hauled in, the ancient wheezing windlass would not take the strain. On that occasion one anchor and its cable had to be hauled aboard fathom by fathom under the full blaze of a tropical sun. It was a job that took the best part of a whole day.

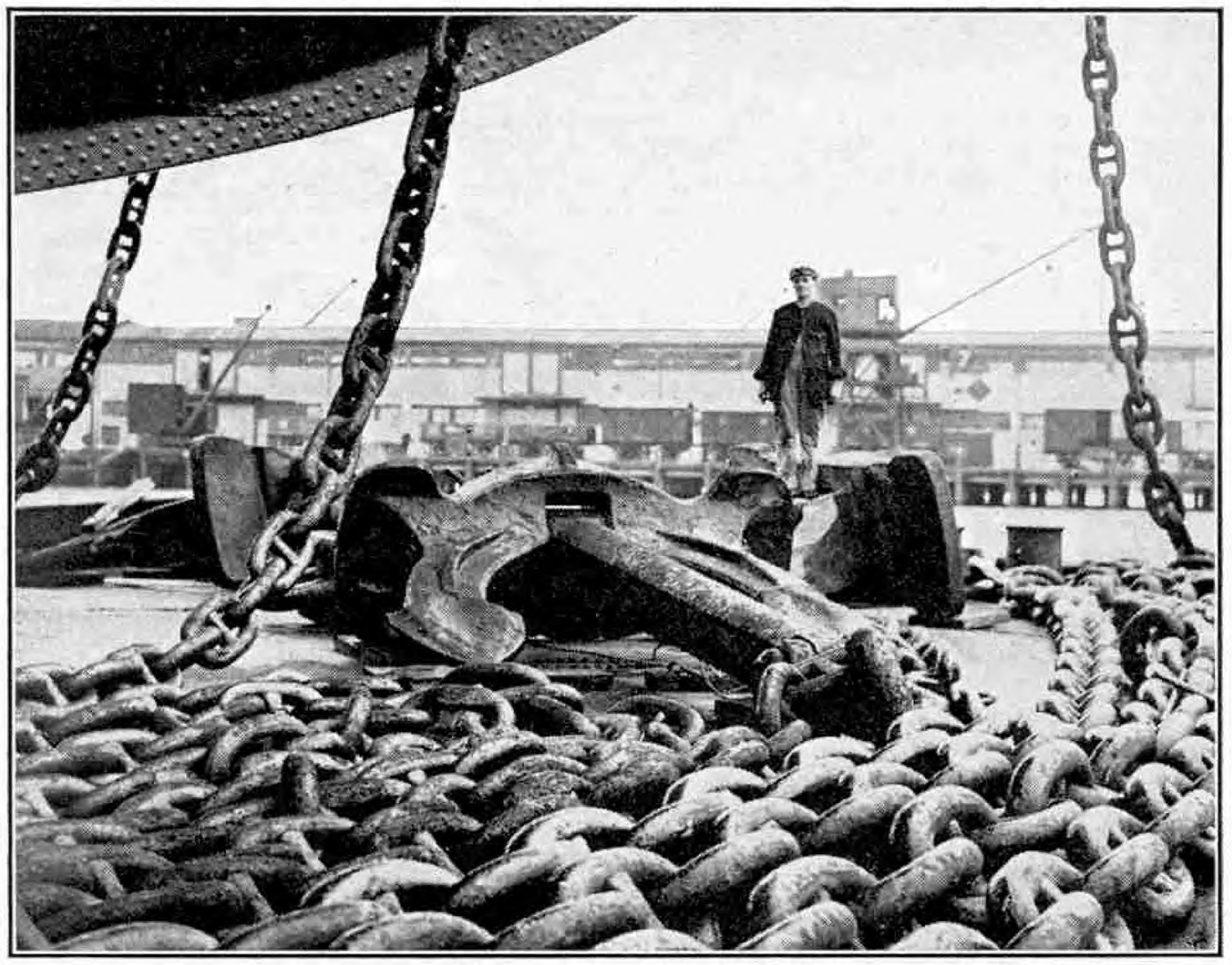
Although anchor accidents are rare in these modern days, they do happen. In most cases, the cable carries away at its weakest link, though there have been instances of actual fracture in the anchor itself.

Some years ago, mail boat skippers made a practice of dashing up a harbour at high speed and relying on the anchors to pull their ships up within a very short distance. This went on for a considerable time until, on one occasion, a cable carried away and killed both the chief officer and ship's carpenter instantly. This practice has been abandoned ever since.

Now and again, too, an anchor will be lost when a cable carries away in a river or tidal channel. To lose a modern anchor means the loss of big money, and if a waterman or lighterman is fortunate enough to make such a find he can be sure of an adequate reward.

Many stories have been told about underwatermen, as those who specialise in recovering such objects as anchors from river beds are called. The craft they use for the job are salvage vessels in miniature, but nowadays their only hope is to arrive on the scene before the official salvage craft. One story of the Thames concerned an underwaterman who managed to beat the salvage vessel to it, hooking a large anchor very soon after it had been lost. As night was coming on, the underwaterman marked the spot with a temporary buoy, but during the darkness a sailing ship skipper reached the spot and dropped his own small anchor to await the dawn. When he tried to heave it up a few hours later he soon realised that his anchor was fast to something valuable. That impression became a certainly not long after, when the underwaterman came out and began to abuse the skipper for "muscling in" on his prize.

After a good deal of argument, the sailing ship skipper agreed to part with the prize for a lump sum,



The three massive bow anchors of the former White Star liner "Majestic," with their huge cables.

this to be paid when the anchor was delivered to the rightful owners. Though the sailing ship had wasted three days while haggling was in progress, her skipper no doubt felt that the compensation would repay him. He did not live to get it, for the sailing ship was no longer afloat when, about a week later, the owners of the anchor paid the agreed reward for the recovery of their anchor. She had foundered with the loss of all hands.

In former days anchors were stowed on the fo'c'sle head, being lifted or lowered over the side by the cathead davit. That was because of the "stock," the bar fixed at right angles to the shank. The modern anchor is known as the stockless type, and it is hove up snugly into the hawsepipe in the vessel's bows. As a result there is little or none of the man-hauling that was an essential feature of former life at sea, and such things as capstan shanties have now become relics of a past that probably will never be recalled.

There are too many types of anchors for them to be described here in full, but one of which little is known is the mushroom or umbrella anchor, used for keeping buoys and lights in position. As its name implies, it looks like a monster mushroom or umbrella. Instead of the flukes at the end of the shank, there is a steel spread shaped very much like an open umbrella. When lowered to the sea bed, this mushroom works its way down and, in course of time, becomes much more firmly embedded than an ordinary anchor would.

The anchor plays a much more important part in safety at sea than most people imagine. Small wonder that it has become, for seafaring Britain, the symbol of all that is steadfast and sure.

Puzzle Your Sharp-Eyed Friends

More Conjuring for Christmas Parties

By Norman Hunter (From Maskelyne's Mysteries)

BY way of a change this year I am going to describe tricks which need practically nothing for their performance except the ordinary articles to be found about the house. To start off with, here is a good rousing "chorus" sort of trick.

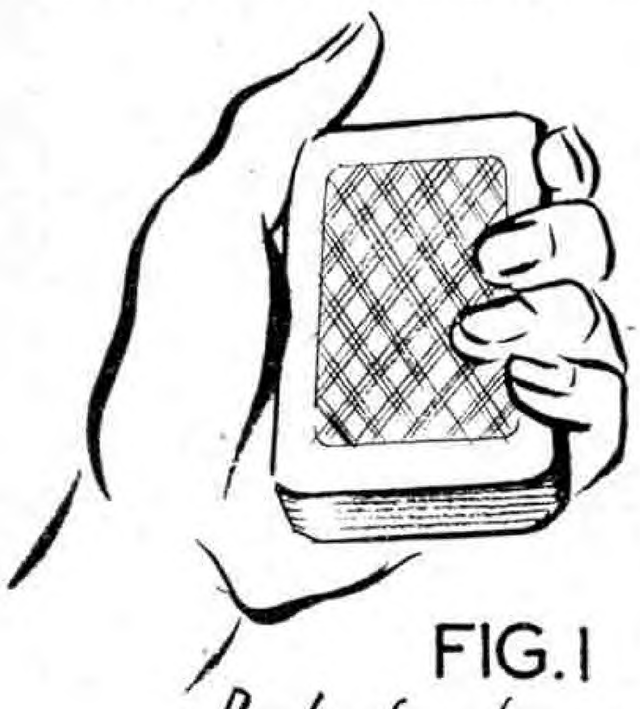


FIG. 1

WHOSE CARD IS THIS?

You begin by showing a pack of cards, and anyone who wishes to do so may examine it because it is quite ordinary. You then go to various members of the audience and ask each in turn to put the tip of his finger into the pack somewhere. You cut the pack at that point and ask him to remember the card at which he has cut.

You now hand round to all the people who have chosen cards, different kinds of noise makers. A whistle to one, a little bell to another, a rattle to a third, a gong to yet another, a squeaker to someone else, and so on until about a dozen people are armed with these articles.

"I am going to deal out the cards" you say. "As soon as anyone sees the card which he cut I want him (or of course her) to blow his whistle, bang his gong, twirl his rattle or otherwise operate the musical instrument he is holding."

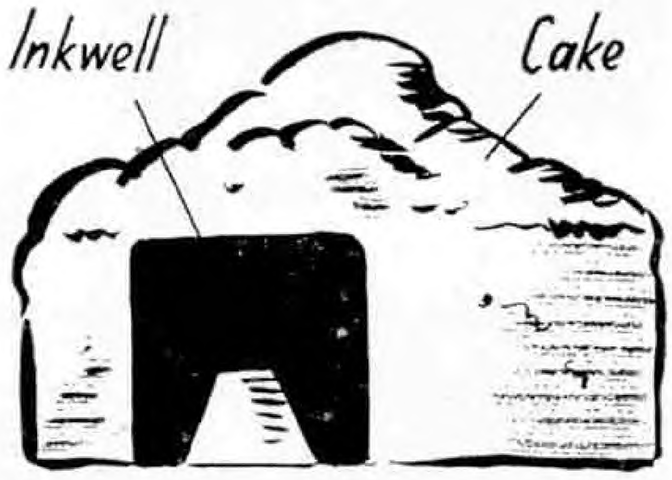


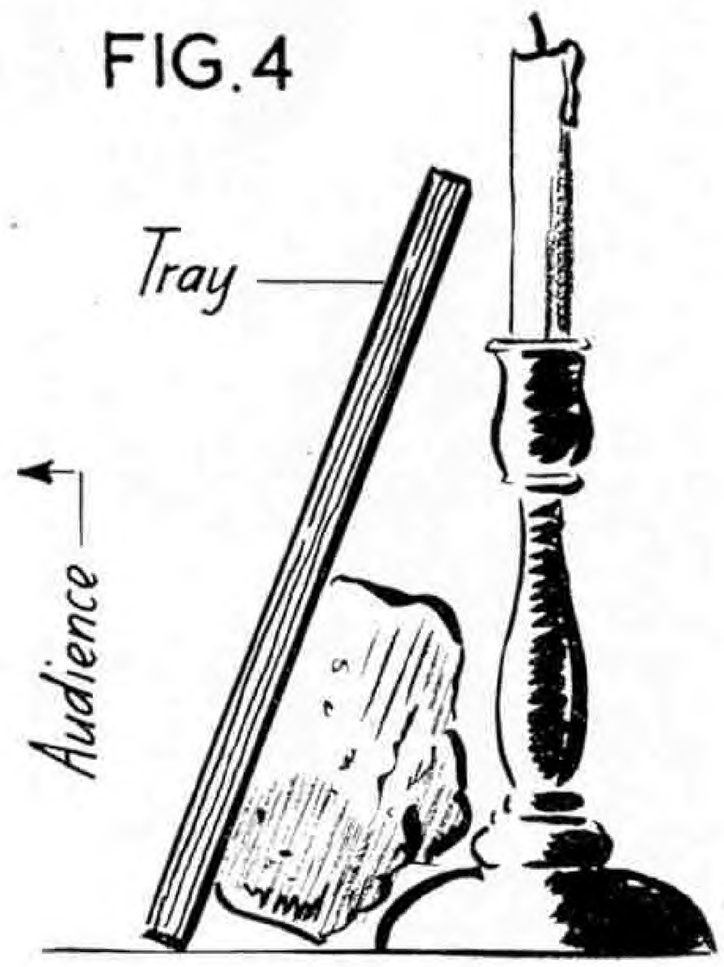
FIG. 3

You commence to deal out the cards one at a time, showing each one deliberately to the audience before putting it down. At about the fifth or sixth card a sudden frantic row breaks out as every single person lets fly with his noise maker. Everyone has cut at the same card!

The Secret. For a highly successful trick the secret is beautifully simple. When you offer the pack for someone to put the tip of his finger between the cards, you hold it in your left hand as shown in Fig. 1. When the place has been indicated, press with your fingers on top of the pack, then lift off the cards above the spectator's finger tip. Lift the cards off with a sliding movement. As you do so the pressure of the fingers of your left hand will cause the top card to stay behind on the lower portion as shown in Fig. 2. Ask the spectator who made the choice to lift the top card of the lower portion and look at it.



FIG. 2



When this has been done, replace the half of the pack that is in your right hand, under the other half. This leaves the same card on top of the pack. Repeat this move with each person and they will of course all cut the same card.

One word of warning. Be careful to go to people as far away from each other as possible and ask each person just to peep at the card and not let anyone else see it. This prevents the surprise finish being guessed at by someone seeing that more than one person is cutting the same card.

Now for a new and easy way of performing a very old favourite:

MAKING A CAKE IN A HAT

You borrow a bowler hat, show it empty and put a tray over it. On the tray you place a glass tumbler and into the glass you drop various ingredients. A little milk, some flour, a few currants and, to add to the fun, some pepper, mustard, castor oil and other horrific commodities. As long as you have some milk and a little flour to thicken it, in the glass, the rest of the ingredients can be

non-existent and you can get a lot of fun by pretending to pour them from large bags labelled with the names of the things, or from big jam jars, also labelled.

You stir up the mixture, take it off the tray and pour it openly into the borrowed hat. Then, lighting a candle, you cook the result over the flame for a moment. Just when the owner of the hat is heartily wishing he had let you borrow someone else's headgear or had brought his Warden's steel helmet for the job, you remove from the hat a nice cake which you proceed to cut up and serve to the audience, returning the hat absolutely undamaged.

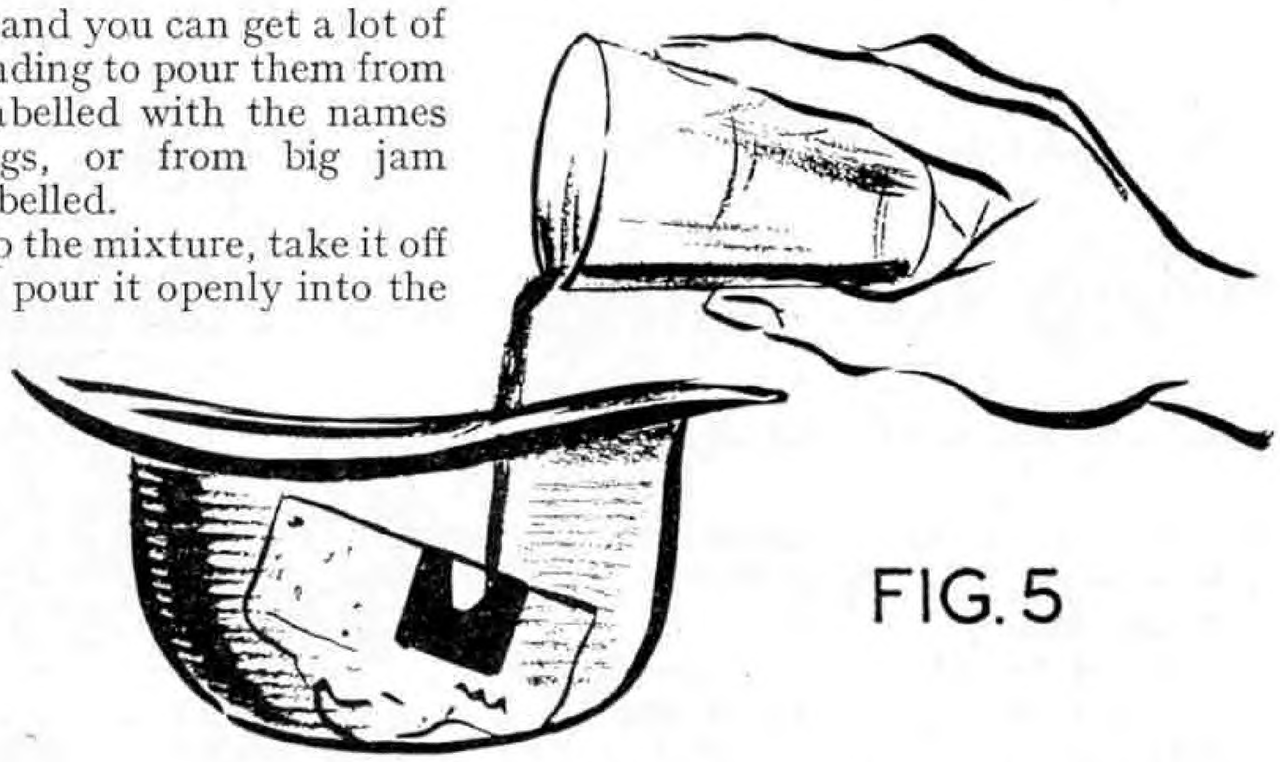


FIG. 5

The Secret. The cake is genuine. A small one of a fairly deep shape that will go easily into a hat is the thing to use. Scoop a hole in the bottom near one side and press into the hollow a large glass inkwell of the "unspillable" kind, as shown in Fig. 3. Stand your tray on edge, leaning against the candlestick and put the cake behind it, the bottom of the cake being against the back of the tray, as shown in Fig. 4. Use a square tray.

Having borrowed the hat and shown it empty, pick up the tray quite casually and lay it over the mouth of the hat. As you pick up the tray your fingers go behind and pick the cake up with it. Keep the tray upright to conceal the cake, bring it down edgeways on to the front of the hat, then sort of hinge it down backwards on to the hat. In this way you can drop the cake in without being detected. The move is quite simple and as nobody knows what is going to happen the risk of being spotted is very small.

Stand the covered hat crown downwards on the table and put the glass on the tray while you make up the mixture. This gives you an excuse for using the tray. When you pour the mixture into the hat you really pour it into the inkwell that is hidden in the cake, as shown in Fig. 5. Be careful not to splash. If any of the mixture falls outside the inkwell it will be absorbed by the cake and as long as you put only flour and milk into it this will not harm either the cake or those who eat it. Mix up the liquid to about the consistency of thin cream, thin enough to pour easily but thick enough not to splash much.

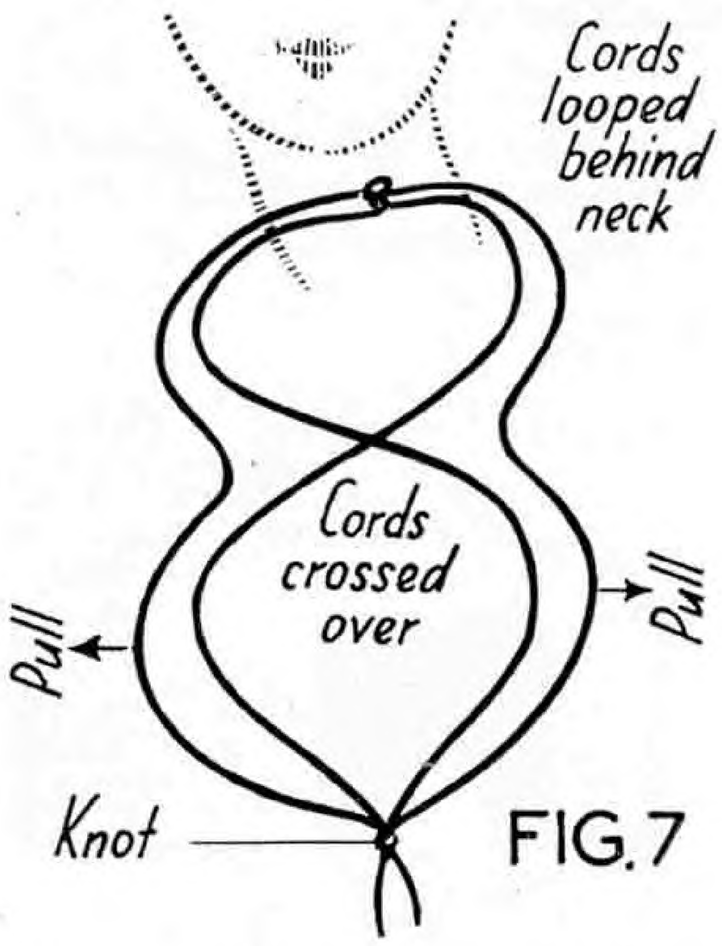


FIG. 7

Now go through the business of cooking the cake over the candle-flame, taking care not to scorch the hat, then produce the cake. As the glass well is at one side of the cake you can cut a good many slices off without touching the hidden secret.

Following this you can say "Having done my best to kill off the audience with my home-made cake I will now give you all a treat by

STRANGLING MYSELF!

For this apparently grim purpose you show two lengths of cord, which can be examined. Placing them together you invite someone to pull them with you tug of war fashion to test their strength. You then calmly tie them round your neck, grasp the loop and pull. To everyone's astonishment the cords seem to pass right through your neck and come away, still tied in a loop.

You then seize on a member of the audience, drop the loop of cord over his head and invite him to try. "Don't pull too hard at first," you warn him, "Because if the trick doesn't come off, your head does."

Of course your assistant finds himself quite unable to do the trick, so you take a hand and repeat it with equal success on him. "Now," you finish, "I return this gentleman to the audience, quite undamaged."

The Secret. Show the two cords one in each hand, holding them by the centre with the ends hanging down. As you place them together, loop the centre of one cord round the centre of the other, as shown in Fig. 6. The looping should be small, only a couple of inches of cord being taken up. Now hold the two cords so that your fingers hide the loop and invite someone to pull at the cords with you. Let them hold one end of the cords while you hold the middle. Any amount of tugging will then have no effect. Next place the cords round your neck and tuck the looped part into your collar at the back which will keep it secure.

Tie the ends of the cords together in an ordinary double knot, keeping the knot at the ends of the cords so as to leave a large loop like a sort of necklace round your neck. Now take one cord from each side and cross it to the opposite side as shown in Fig. 7. It does not matter which cord you take. If you now grasp the cords, two

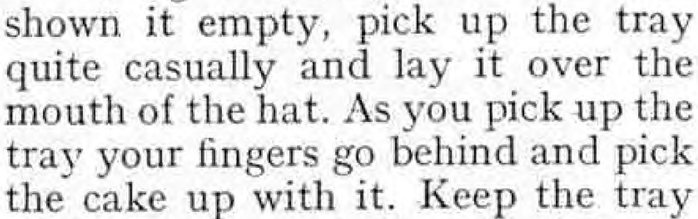


FIG. 6

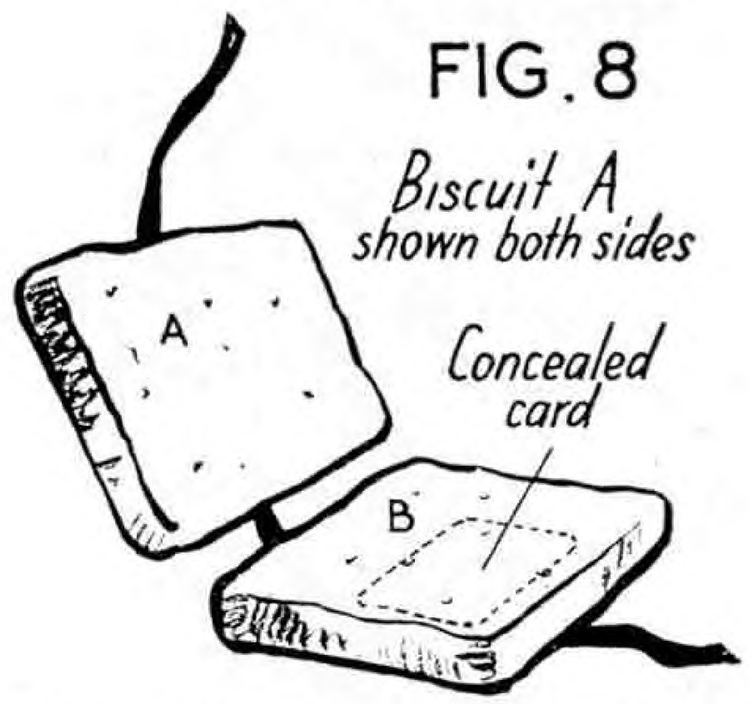
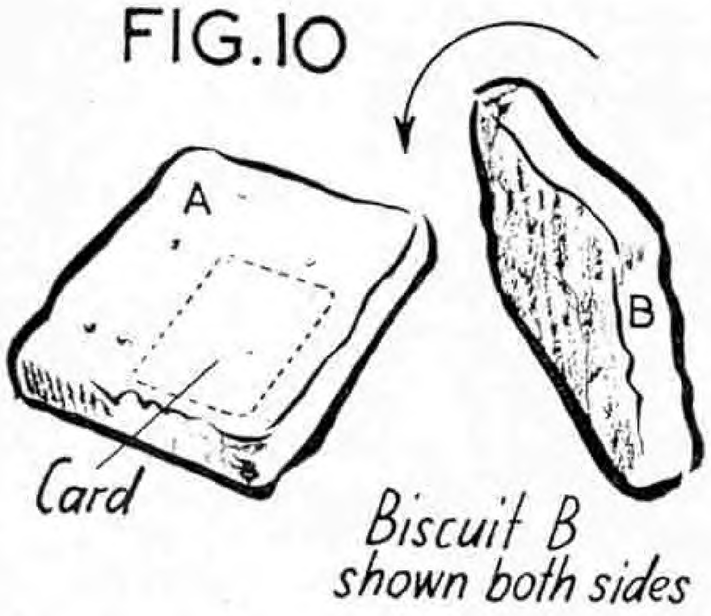


FIG. 8

in each hand as indicated in Fig. 7 and pull steadily sideways away from your neck, the loop at the back will be pulled apart and the cords will slide round your neck, coming away at the front as a complete loop.

When you drop the loop over your assistant's head he is of course unable to do the trick because the cords really go round

FIG. 10



his neck. You then take them off his neck and ask him if his head is fixed to his body and when he says that it is, explain that to do the trick properly the head should be fixed to the neck. While saying this you can easily loop the centres of the cords together as before. Doing the trick again on your assistant is simply a repetition of what you did with the cords round your own neck.

THE SOFT WATCH

After borrowing a watch you tell the owner that it seems to be getting very soft and you proceed to bend it about.

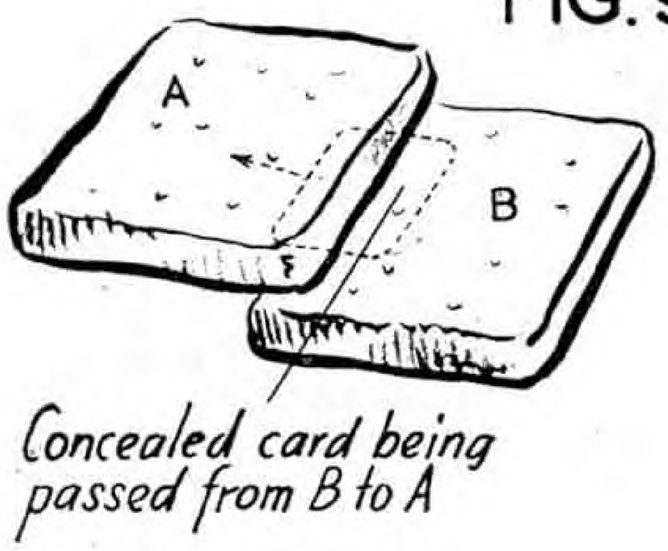
The Secret. To do this you take the watch, any ordinary watch, not a special trick one, between your hands, holding it with the tips of the fingers in front and the thumbs behind. Now move the finger tips forward and back several times, imitating the movement of bending the watch. This rather waving motion of the hands and the bright reflections from the watch produce a perfect illusion of bending the watch.

THE DOG'S DINNER

An amusing card trick. You bring forward two large dog biscuits tied together with ribbon, untie them, show the biscuits on both sides and tie them up again. You then give them to a member of the audience to hold on a plate.

Next you ask someone to choose a card and tear it to pieces. This is to be the meat for the sandwich and you explain that you want it well minced. One piece of card is given to the person who chose it, which he is asked to keep. The remaining pieces are then cooked, or, in other words, burned. The ashes are sprinkled over the dog

FIG. 9



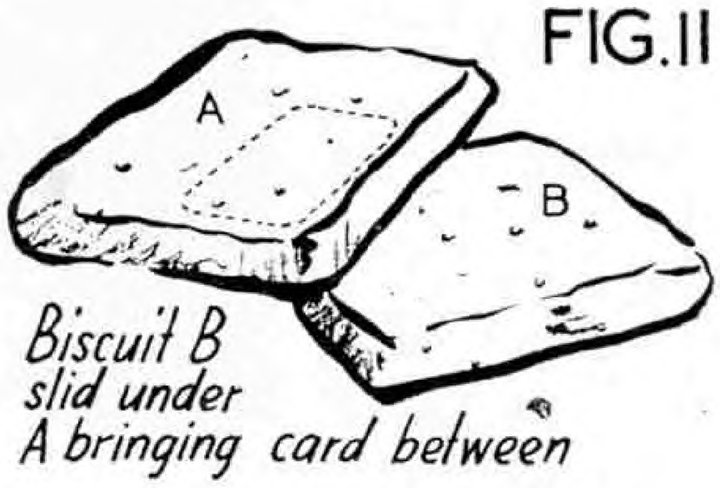
biscuits and when these are untied the card, restored except for one piece, is found between them. Strangely enough the piece held by the spectator exactly fits the gap, thus proving that the same card has been restored.

The Secret. Well, of course, you can be sure of one thing and that is that the same card hasn't been restored. It is a duplicate. This is how you manage it.

Take a card, say the ten of spades and tear off one corner. Put the corner under an ash tray and slip the damaged card under the ribbon that fastens the dog biscuits. The card is underneath both biscuits, not between them at this stage. Have another ten of spades on top of the pack.

Start with the biscuits. Show the packet and untie the ribbon. Open the biscuits like a book and allow everyone to see there is nothing between them (Fig. 8). Now turn over the top biscuit (A) and show the other side of it. Next slide the card from under biscuit (B) under (A) that you have just shown (Fig. 9). You can then turn the biscuit B over (Fig. 10). Finally put the biscuit A which now has the card under it,

FIG. 11



on top of the other biscuit which brings the card between them. Tie up the ribbon and put the packet on a plate (Fig. 11).

Now take the pack to another spectator and ask him to mention a small number. Suppose he says "seven" you count off seven cards and show him apparently the seventh. What you really do is to count the cards off by drawing them off the pack one at a time with your right hand. The top card, which is the duplicate ten of spades, comes off first. When you have counted seven cards, turn the packet over. Of course the top card, the card you want selected, is always the one turned up whatever number of cards is counted.

Have the card torn up while you fetch the ash tray. Conceal the corner of the card that is already between the biscuits, in your hand. Receive the pieces of torn card on the tray and pretend to pick up one piece. Actually you bring into view the piece concealed in your hand and give this to the person who took the card. As this is the piece you tore from the card which will later be found between the dog biscuits, the piece is bound to fit.

Finally here is a puzzling little trick.

GREENGAGE SOUP

You begin by showing a soup plate on both sides, also a piece of newspaper. You put the plate upside down on the newspaper.

"In that position," you say, "the plate cannot be filled with soup. That's what you think. But conjurors love to do things which can't be done, so here goes."

You introduce the greengage soup, which turns out to be a green silk handkerchief. You tuck the handkerchief into your pocket, wave a spoon over the inverted plate, turn the pocket inside out and show that the handkerchief has vanished. You then lift the plate and there is the "greengage soup."

The Secret. Apart from the fact that you need two handkerchiefs exactly alike, there are no special requirements. Take one handkerchief, bunch it up and place it under the edge of the newspaper. Put the plate on top to hold it down. Have the other handkerchief over the back of a chair.

Pick up the paper with your right hand and the plate with your left. The fingers of the right hand grip the bunched-up handkerchief behind the paper. Show both sides of the plate and put it, bottom towards audience, into your right hand in front of the paper. Now draw the newspaper away as shown in Fig. 12. This leaves you holding the handkerchief under the plate. Show both sides of the paper, lay it on the table and drop the plate casually on it. The handkerchief is thus secretly introduced under the plate ready for the end of the trick.

To vanish the handkerchief from your pocket you can employ either of two methods. You can tuck it into your trouser pocket and secretly push it up into the top corner of the pocket. The pocket lining can then be drawn out and the handkerchief will remain concealed. The other method is to show the inside pocket of your coat to be empty, then apparently put the handkerchief into it. Actually you tuck the handkerchief well down in the top pocket of your waistcoat but as you keep your right side turned to the audience as you do so it looks as if the handkerchief is going

FIG. 12



into the inside coat pocket. The rest of course is easy.

Don't forget to try the tricks over on your own before you attempt to perform them to an audience. The easiest trick needs to be rehearsed a few times in private before being shown to even the smallest audience, and every trick needs to be presented in an entertaining manner. In order to divert the attention of the audience at critical moments in the performance of a trick a few jokes and witty sayings should be selected and memorised. Even when the greatest care is taken it is always possible for some little thing to go wrong during a trick, and if the conjurer can keep on talking there is a much better chance of remedying the mistake without anybody in the audience noticing that anything amiss has occurred.

Drop-Forging

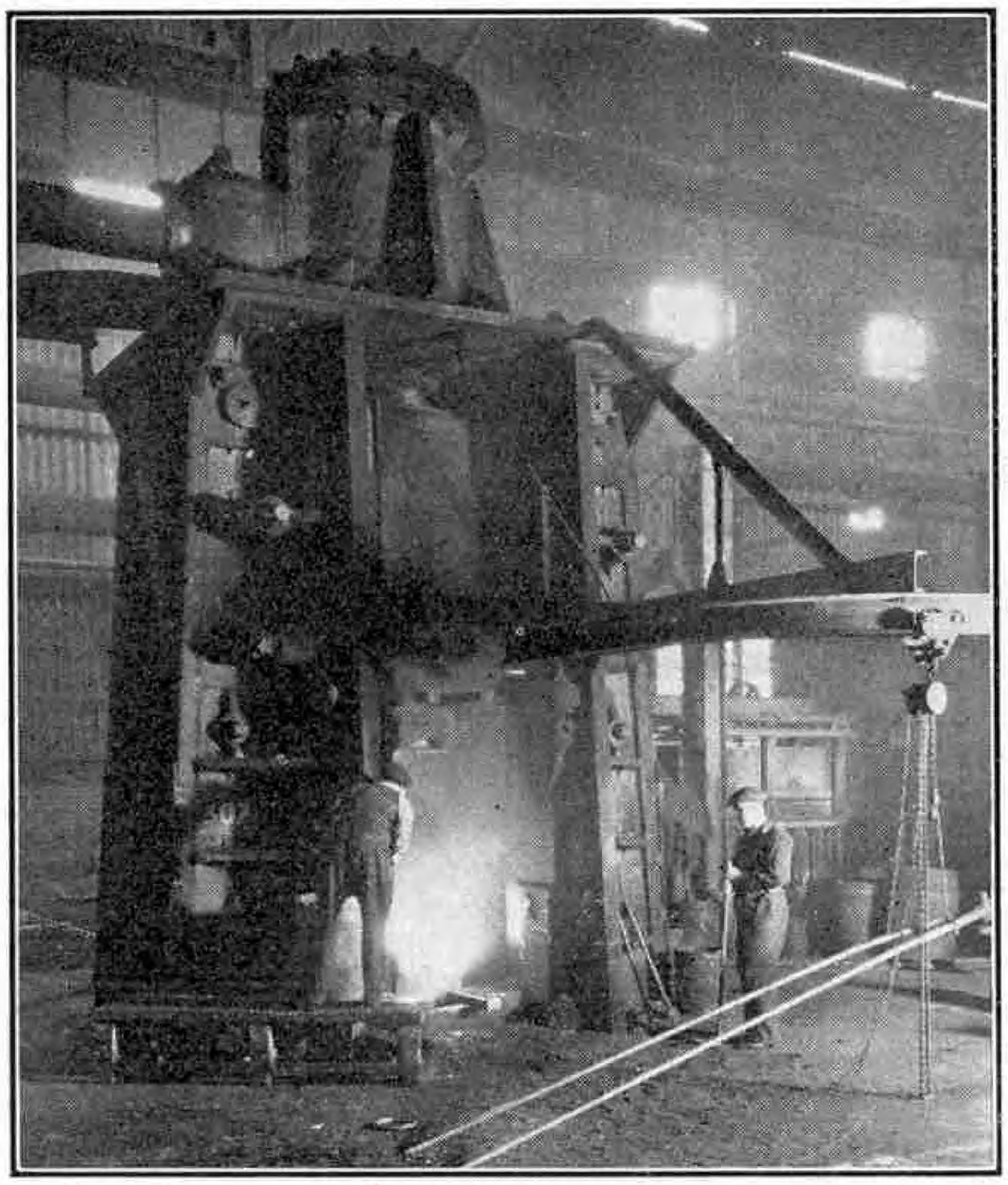
DROP-FORGING to-day plays a vital part in engineering. Present-day requirements have created a demand for the mass-production of parts, very often of intricate shape, which require a minimum of machining. In addition they must have such excellent physical properties that engineers and designers can with confidence subject parts of much smaller dimensions to much greater stresses than was ever possible with hand forgings.

Most of the steel used for drop-forging is produced in the electric furnace. The steel is cast into ingots, and these are heated and rolled into long bars or billets of the required section, and cut off to the length required for the forging operations.

The principle of drop-forging is the displacement of metal, rendered plastic by heat, and forced by blows or pressure into dies formed to the desired shape. It follows therefore that the most important feature is the making of the dies. These are made from forged blocks of special alloy steel varying in tensile strength from 65 to 95 tons per sq. in. Before cutting or sinking the impression in the dies, careful thought is given to the function of the finished article, and the manufacturing procedure is so arranged as to ensure a grain flow that will give maximum resistance on the parts of the forging to be most highly stressed. Care must be taken that in the actual forging operation the displacement of metal is not too free in any one direction, and also that there are no sharp corners in the impression, as these are apt to spoil the flow.

The design or shape is marked out on the die blocks, and these then pass through the various stages of milling, cutting, shaping, and final sinking by a die fitter. Hot lead is then poured into the impression, and when set is checked for dimensions, radii, etc.

The manufacture of drop-forgings covers such a wide area that it is only possible to deal with it briefly. When the dies have been made and samples taken, the size and weight of steel billet can be decided, and also the weight of drop hammer required. When talking of the weight of a drop hammer it is interesting to note that this is not the weight of the whole unit, but of the top die holder or tup as it is known in the trade. In the majority of drop hammers the tup only is movable, and is driven either by steam, air or electricity. In some cases, however, the bottom die moves to meet the top die, and this is known as a double-action hammer. Steam is used to drive this type, and the dies are fastened in by steel bands.



Heat Treatment Furnace.

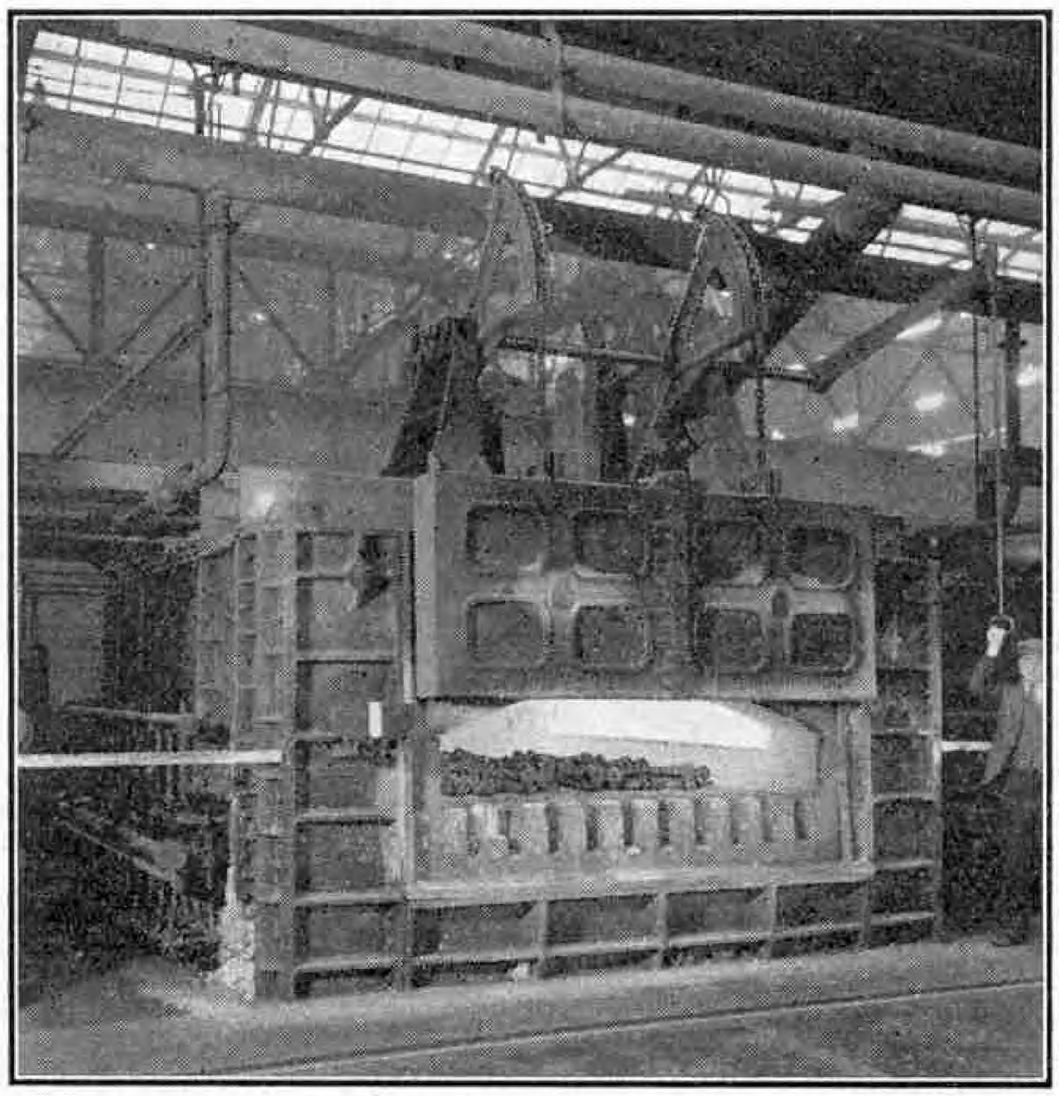
Our cover illustration shows an electrically-driven hammer with the top die only movable.

The actual manufacture is governed by the design of the article. In the simpler parts the bar or billet is heated, laid in the dies, and by a number of blows is formed to the required shape. In more intricate designs, however, it is necessary to pre-forge the bar or billet to something approaching the desired shape before commencing the actual drop-forging. Furthermore it is often necessary to pass the forging through three or four sets of dies, each set taking it nearer to the final shape.

On the completion of the drop-forging operations the articles are heat-treated to give the requisite strength, the scale is removed, and they are finally examined in gauges, jigs, etc., before despatch. Most drop-forgings must also be tested to meet the conditions of the specification, and all stampings are passed under a Brinell machine to ensure that the correct hardness has been obtained.

There are many other stages of manufacture before the forgings reach their finished state, but it is beyond the scope of this article to describe them in detail.

For the information in this article and for the photograph on which our cover is based we are indebted to English Steel Corporation Limited.



15-ton Hammer with Top and Bottom Dies movable. The illustrations to this article are reproduced by courtesy of English Steel Corporation Limited.

ENGINEERING NEWS

British Racing Driver's Fine Record

Five of the chief motoring records in this country are now held by Raymond Mays, the famous British racing driver, who is shown in action in this year's Crystal Palace Cup Race in the lower illustration on this page. These records include the fastest times for the Shelsley Walsh Hill Climb, the Prescott Hill Climb and the Brooklands Mountain Course. Mays also holds the Crystal Palace lap record with a time of 1 min. 58.2 sec., and the Campbell Circuit record with a time of 1 min. 44.91 sec. The previous record for this course was held by A. Dobson, who set up a time of 1 min. 47.46 sec. Mays believes that he is first driver to hold all the above records at one time.

A New Traffic Control System

A new system of automatic signals for the control of fast-moving traffic has been installed in the south of England at the point where the Winchester by-pass road links up with the Portsmouth road. The system is operated by means of duplicated vehicle detector pads sunk in the road at a considerable distance from the traffic lights.



R. Mays in action during the Crystal Palace Cup Race this year. A brief account of the records held by this famous driver is given on this page. Photograph reproduced by courtesy of L. Klemantaski, London S.W.1.

The time taken by vehicles to reach the junction after passing over the detector pads allows fast traffic to go through the cross-roads almost without slackening speed. The system is the first of its kind that has been put into operation.

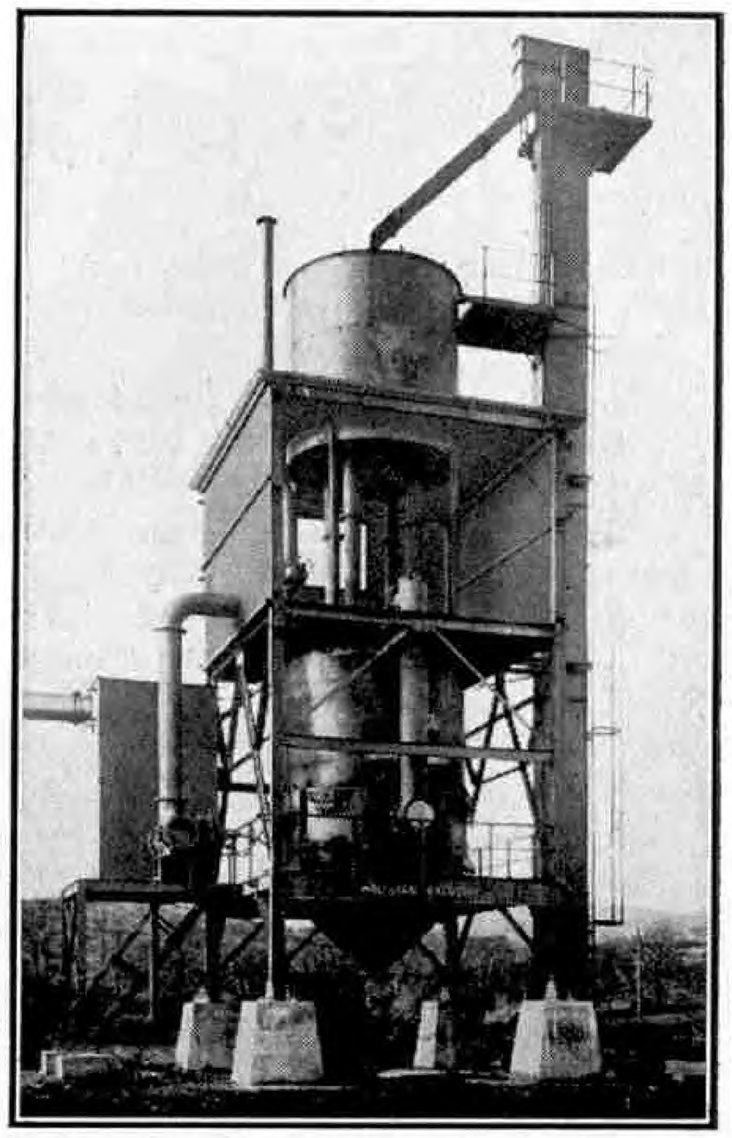
Producer Gas for Firing Furnaces

The illustration on the right shows a large plant designed for producing gas for firing forge and other industrial furnaces. The plant is one of a range of various types manufactured by The Wellman Smith Owen Engineering Corporation Ltd., London, and installed in numerous industries in Great Britain and other countries. Some of these plants produce gas from bituminous coals, but that shown in the illustration is designed for use with either anthracite or coke, which is fed into the upper cylinder at the top of the plant by means of a conveyor elevator operating inside the girder framework seen on the right in the illustration. Gasification takes place in the lower part of the plant, the gas finally being led off through the horizontal pipe shown on the left.

A New Motor Fuel

A public demonstration of a new motor fuel known as "liquid coal" was given in the United States recently by Dr. Francis W. Godwin, of the Armour Institute of Technology, who drove through Chicago streets a car the engine of which was supplied with it.

Liquid coal is a dark coloured fluid containing light oils with 30 per cent. of pulverised coal and a small amount of a secret substance. The car was started with petrol, and as soon as the engine reached



A large plant for making gas from coal or coke. Photograph by courtesy of The Wellman Smith Owen Engineering Corporation Ltd., London.

driving heat the petrol supply was cut off and liquid coal from an auxiliary tank was fed into the carburetter, which was of standard type. It is claimed that the new fuel gives a run of from 10 to 15 m.p.g.

Improved Driving Cab for Motor Lorries

A new type of cab that will enable drivers of motor lorries to obtain an unrestricted view when reversing, and yet allow them to keep both feet on the controls and hands on the steering wheel, has been designed and built by the Great Western Railway Company. The new cab extends to the full width of the vehicle on the right-hand side, thus differing from the usual type of vehicle in which the body often protrudes by about a foot beyond the cab on both sides, blocking the driver's view to the rear and making it necessary for him to lean out, often through an open door, with consequent partial loss of control. The new cab overcomes these difficulties as the vehicle can be driven from the extreme right-hand side. The cab has sliding doors.

Magnesium to be Extracted from Sea Water

Sea water is a possible source of certain chemicals, which are present in large quantities, but usually such small proportions that they cannot be extracted profitably. Magnesium chloride is an exception, and a plant to extract it from the waters around the Ligurian coast is to be established in Italy.

The magnesium chloride recovered will be used for the manufacture of metallic magnesium. A factory is being designed to produce about 1,200 tons of the chemical per year, but provision is being made to extend its capacity to 3,000 tons annually when conditions allow.

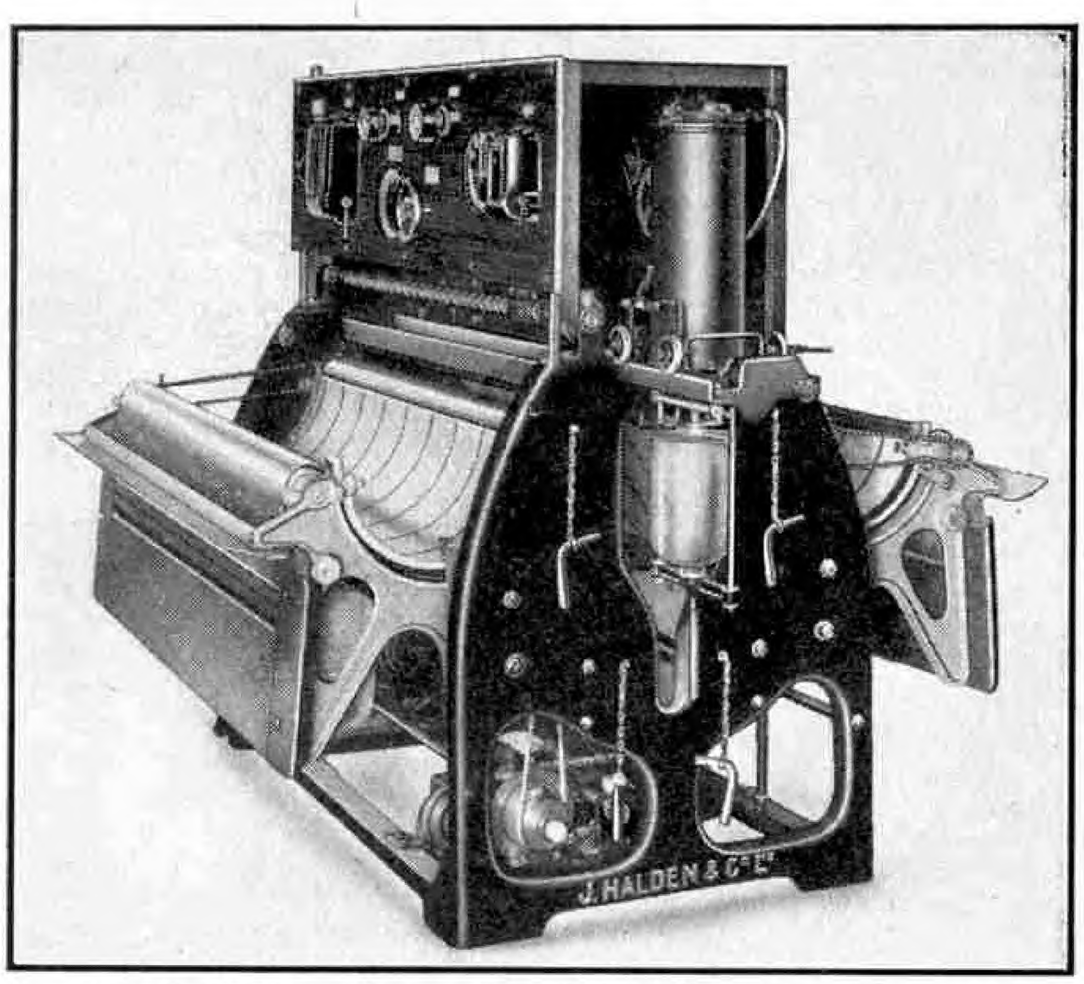
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A 10,500 ton electric ship, to be called the "*Trud*," is now under construction in the U.S.S.R. It will be fitted with two Diesel engines of 3,400 h.p. driving two 2,260 kW electric motors, and will have a speed of 13.3 knots.

Machine for Making Blue Prints

The upper illustration on this page shows an electrically-operated photo-copying machine, designed for producing blue prints of engineering drawings and similar photographic copying work. The machine is one of a range manufactured by J. Halden and Co. Ltd., Manchester.

The blue prints are produced from tracings on paper sensitive to light. The two are placed in contact and fed by a conveyor band into the machine, where they pass round the curved surface of a sheet of glass bent into the form of half a cylinder. Light for the exposure is provided by either one or two travelling arc lamps, which move along the axis of the half cylinder, and the speed can be varied as required by means of patent infinitely variable gearing, which enables any speed to be attained up to the limit of the particular machine employed. This may be 9 ft. or 20 ft. per minute. The controls are centralised in front of the operator on a control board.



A modern electrically-operated machine designed for producing blue-prints and similar copying work. It is one of a range manufactured by J. Halden and Co. Ltd., Manchester, to whom we are indebted for our photograph.

The machine is made in both single and double patterns, the latter having two half cylinders, as shown in the illustration on this page.

New Life-boats for Rhyl and Port Erin

A new motor life-boat built at Cowes for the Royal National Life-boat Institution station at Rhyl is now in service. The new boat is of the surf type, the lightest in the Institution's fleet. She is 32 ft. long, weighs just over 4 tons, and has two 12 h.p. engines.

The boat has no propellers. Instead she is fitted with Gill jet propulsion, a method much used in ferry boats in Scandinavia. In the bottom of the boat on each side is a tube shaped like an inverted capital U, and open at each end to the sea. A propeller at the top of each tube sucks water up the forward arm of the tube and drives it out of the after arm, the reaction giving the boat a forward movement. A grating in the after arm can be set to drive the stream of water astern or sideways to give the necessary manœuvring power. The speed of the boat is 6½ knots, and she can travel nearly 90 miles at full speed without refuelling. The crew number seven, and 15 people can be taken on board in rough weather.

The new Rhyl life-boat has been built out of a legacy from the late Mr. H. B. G. Warren, Liverpool, and will be named *"Gordon Warren."* The boat she has replaced is an interesting one. She was the last of the tubular type of pulling and sailing life-boat, which had a double hull, consisting of two floats meeting at each end with a grating deck in between. Her designer was a Welshman, and Rhyl has had life-boats of this type since 1856.

Another new life-boat built for the Royal National Life-boat Institution's station at Port Erin, Isle of Man, arrived at her post after a voyage of eight days, in the course of which calls were made at Weymouth, Brixham, Fowey, Penzance, Padstow, Fishguard and Holyhead. This vessel is of the Watson type, 41 ft. long, weighing 15 tons. She is driven by two 35 h.p. petrol engines, which give her a speed of over 8 knots, and she can travel 116 miles at full speed without refuelling. She carries a crew of eight, and has accommodation for 50 people.

October of this year was a record month for the life-boat service. In it boats were launched 100 times, the largest number ever recorded in October, and more than twice as many as in October of last year. The number of lives saved was 107 and 132 persons who had been on ships in distress were landed. Since the war started life-boats have been launched 149 times, and have saved or landed a total of 424 people, an average of seven persons a day.

A Glass Pump for Chemical Manufacture

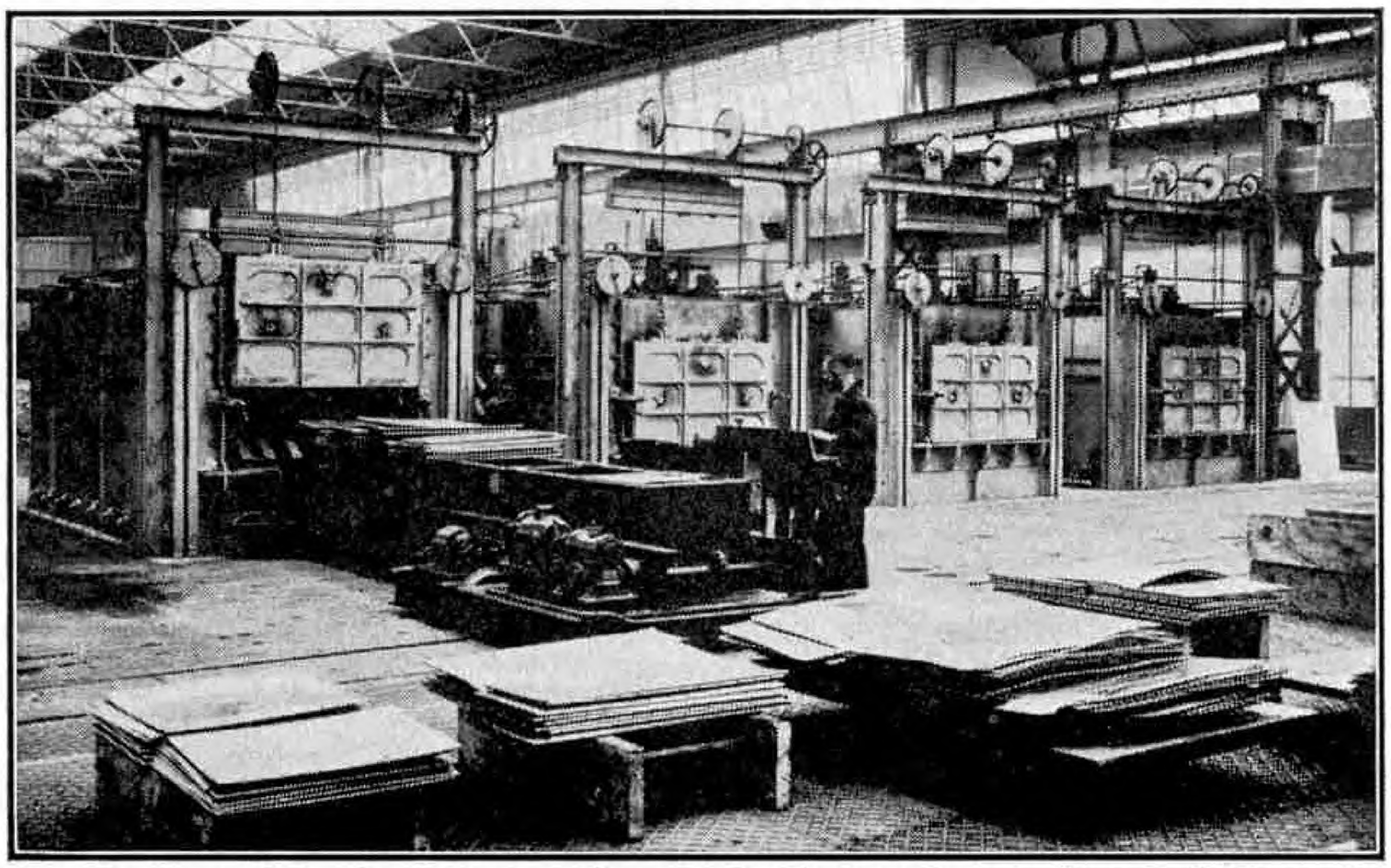
Chemical manufacture on a commercial scale entails the use of apparatus specially designed to withstand the action of corrosive and sometimes highly inflammable substances and the high pressures and temperatures involved in certain processes. One of the latest developments in this direction is a special centrifugal pump that has been produced at the Corning Glass Works, in the United States, for handling acids. The pump is made entirely from glass. Its casing, impeller and all other parts exposed to contact with liquid when the pump is in action, are of clear transparent heat and shock resisting glass. The pump has a capacity of 6,000 gallons per hour, handles liquids at temperatures up to 150 deg. F., and is designed to run at high speeds without vibration.

An Electrical Furnace Charger

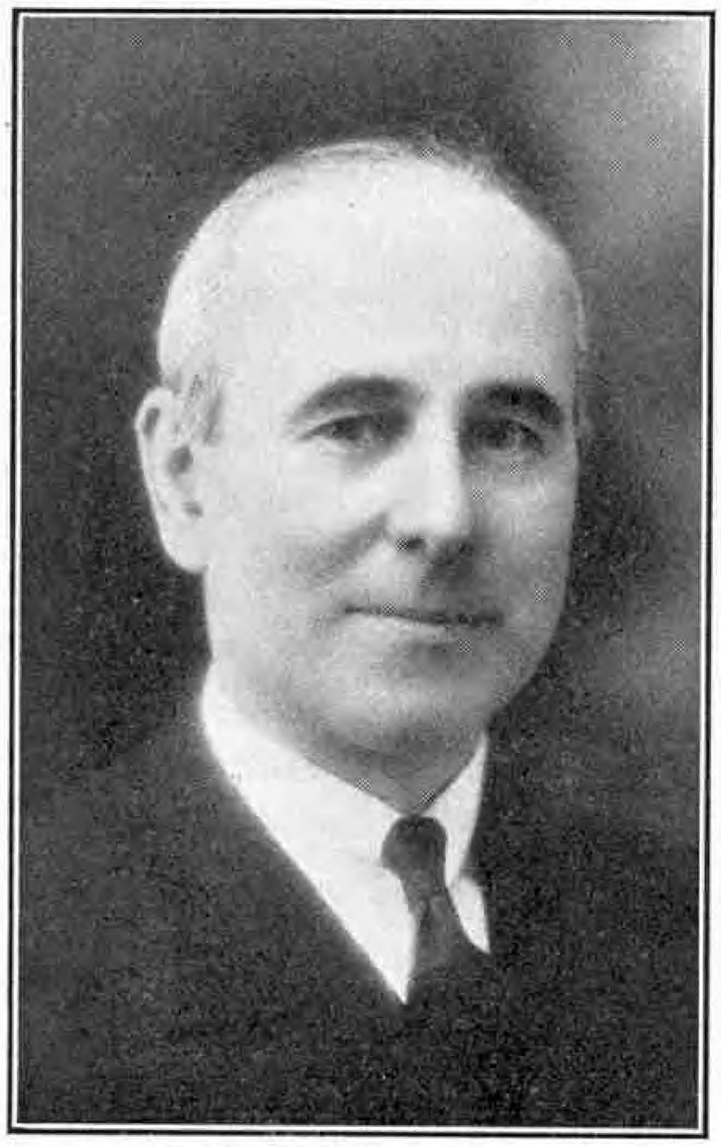
The lower illustration on this page shows an electrically-operated furnace charger made by The Incandescent Heat Co. Ltd., Smethwick, Birmingham. It is used for introducing metals into furnaces to receive heat treatment, and for removing them at the end of the process.

The machine runs on rails along the front of a battery of furnaces. It has a frame built up of steel channel girders forming runners for the wheels of two charging forks, which consist of rectangular section mild steel bars firmly braced and welded together. The forks have a reach of 12 ft. 6 in., and are designed to handle loads up to 3 tons. At their front ends they move over rollers fixed to a crosshead that is mounted on the ram of a hydraulic jack, and by raising or lowering this the forks can be set at the correct level for loading and unloading any particular furnace. At the rear the forks end in a shaft carrying a travelling wheel and they are moved backward and forward by a chain driven by an electric motor.

All the switches and other controls are grouped on a single panel, and thus are within easy reach of the operator. Electro-magnetic brakes are fitted, and the sheets of metal and other materials handled can be placed in their correct position in the furnace, and the forks withdrawn, with the greatest precision.



An electrically-operated charging machine for loading metals into furnaces and removing them after heat treatment. Photograph reproduced by courtesy of The Incandescent Heat Co. Ltd., Birmingham.



Sir Alliott Verdon-Roe.

A Pioneer British Aircraft Firm

Fine Record of A. V. Roe and Co. Ltd.

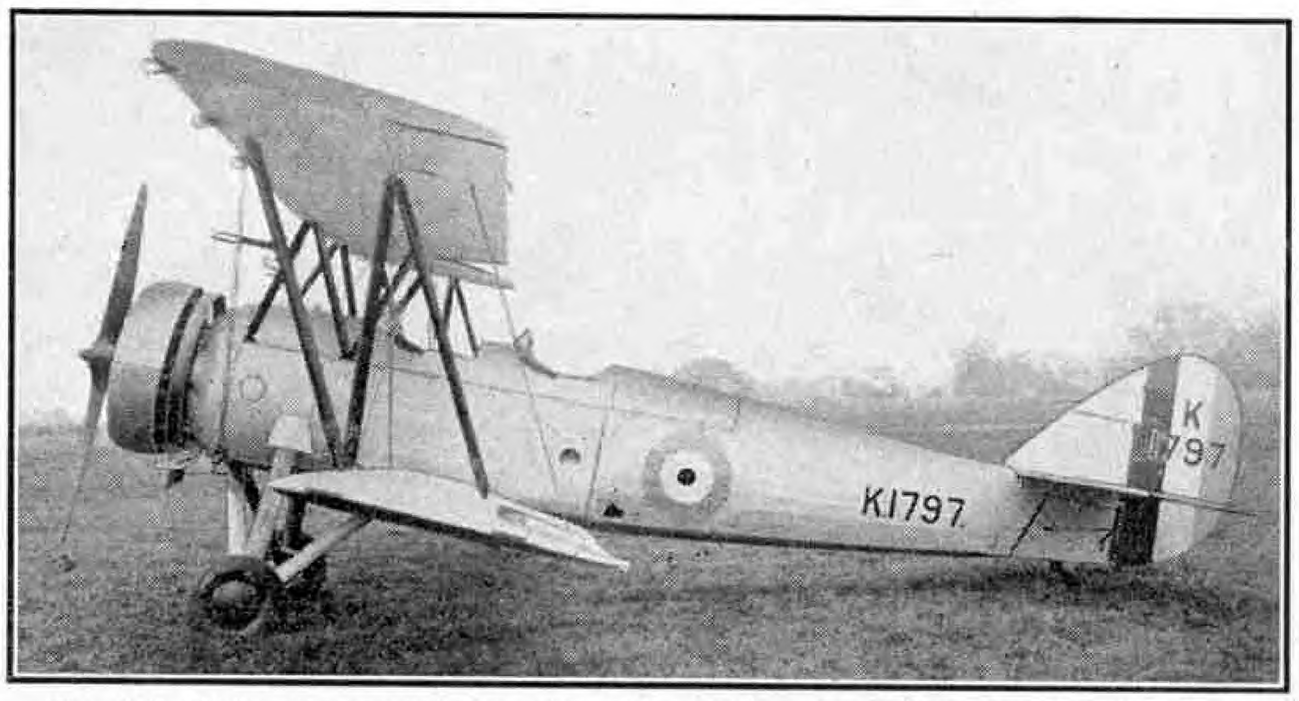
IN the 36 years since Orville Wright made the first flight in a power-driven heavier-than-air machine, the aeroplane has been developed from a crude structure of uncertain ability into a fast, streamlined, and well-equipped liner of the air, capable of long flight with a heavy load of passengers, freight, or military equipment. British aircraft firms have played an important part in this development, and one of the foremost of these firms is A. V. Roe and Co. Ltd., of Manchester, founded in 1909 by the pioneer of aviation whose name it bears, and formed into a limited company in 1913.

Mr. now Sir, Alliott Verdon-Roe was one of the earliest British aircraft enthusiasts, and from 1906 he devoted his time and savings to making the aeroplane a practical success. His first step was to build in a shed at Brooklands a full-size biplane in which he made arrangements to use a 24 h.p. 8-cylinder Antoinette engine. While awaiting the engine he made several flights, in which he started off with the aid of tows from motor cars. But these ended in crashes, as the towers would hang on too long in their excitement! The engine finally reached him in the spring of 1908, and on 8th June of that year he accomplished the first flight ever made in England, covering about 60 yds. at a height of some 2 ft. from the ground.

At this point Roe's troubles began. First of all he received notice to quit Brooklands, where he had never been popular with the management, who seemed to have forebodings of the track being covered with the wreckage of aeroplanes. Then the War Office refused him leave to erect his shed alongside that of Cody at Laffan's Plain. Finally he succeeded in renting a couple of railway arches near some large open fields at Lea Marshes in north-east London. There he brought a tractor triplane that he had built in the stable of his brother's house at Putney, and with it he made many successful flights. At first these flights were short and low, and the nickname "Roe the hopper" was probably well deserved. After many mishaps his hops gradually lengthened, however, until he was able to cover a distance of 300 yds. at a height of from 6 ft. to 10 ft.

An amusing story is told of a young woman who went down to commit suicide in the river Lea, but went home again when she saw the aeroplane. She had only changed her mind with regard to the manner of her suicide, however, for she wrote to Roe urging him to let her take his place in the machine so that his life would be saved at the expense of hers. He tactfully promised that he would allow her to fly the machine when he had perfected it, thus leaving her something to which she could look forward!

Roe removed from Lea Marshes to Wembley Park, where he made constant flights with increasing success. Shortly afterwards he returned to Brooklands, and in partnership with his brother produced a 35 h.p. tractor triplane that attracted a great deal of attention. This machine had two upper wings of equal span and very long, and a third and much shorter wing below them. The wings were kept in position by equally-spaced pairs of vertical bracing wires, and the bottom one was secured to the underside of the fuselage framework, which was sometimes flown without waiting to be covered after a smash. A four-wheeled undercarriage was fitted. This triplane could carry a passenger and a pilot, and Roe demonstrated its ability at the Blackpool aviation meeting of 1910.



The Avro "Tutor," a training biplane that inherited the wing stagger of earlier Avro types.

The performance of this machine gave rise to a controversy as to the relative merits of the triplane and the biplane. This was ended by practical test when the Avro company built a single-engined biplane with a skeleton fuselage exactly like that of the triplane, and wings of the same total area. The performance of the biplane proved to be so superior to that of the triplane that production of the latter type was stopped. This biplane was extensively used in the Avro school at Brooklands during 1911.

In 1912 appeared the Avro 500, a biplane type destined to become world-famous, and the first of the company's machines to be known by a serial number. The general design of the Avro 500 was one of the most advanced of that time, and in it a really serious attempt was made to reduce head resistance. The fuselage was covered, and tapered towards both the nose and the stern. It was large enough to accommodate the engine and the crew of two, for whom dual control was provided. A curved skid was fixed centrally to the leaf-spring axle of the two-wheeled undercarriage. The good performance of the new biplane resulted in orders being received for 12 machines of this type for the War Office and Admiralty, and these orders were the real beginning of the manufacturing side of the company's business. Some of the 12 aircraft were used at the Central Flying School of the Royal Flying Corps, and gave good service.

The Avro company made aviation history in 1912 by constructing a monoplane in which the crew occupied an enclosed cabin. This was the first totally enclosed aeroplane in the world. An Avro cabin biplane also was produced, and with this machine a British duration record of 7 hr. 31 min. was achieved.

With each new type of aircraft produced the Avro designers grew in knowledge and experience, and the Avro 504 biplane introduced in 1913 reflected their progress. It differed from the 500 type in having wings with a pronounced stagger, and of better construction. They were also of greater span and chord than those of the earlier biplane. The original Avro 504 was tested at Brooklands in July 1913, and later took part in several sporting events. Early in 1914 it was bought by the *"Daily Mail"* for use with a Blériot monoplane to give flying demonstrations in different parts of England, Wales and Ireland. The purchasers required it to be able to take off from either land or sea, and the Avro company had to design for it an interchangeable twin float undercarriage. At the *"Daily Mail"* demonstrations the Avro biplane was flown by Raynham, a well-known airman of that time, and at many of the places visited the people had never seen an aeroplane before. The machine finally crashed at Shoreham, engine failure causing it to make a forced landing on the ground while fitted with the float undercarriage.

About the middle of 1914 orders were received for 12 Avro 504 biplanes for the

War Office and one for the Admiralty, and several had been delivered to the War Office by the time war broke out. A big demand for military aircraft followed, and 504s were used extensively in France. The only armament they had was a pistol carried by the pilot, and in some cases a rifle used by the observer. Later several of the machines were equipped with a Lewis gun. The Avro 504s were employed with great success on a variety of duties, including reconnaissance, gun-spotting, photographic work, and light bombing. In time it became evident that they were not fast enough to deal with the new enemy aeroplanes, and they were withdrawn from France about the end of 1915.

In England the 504 was found to be an ideal trainer, and in 1917 the Avro 504J, a modified version of the original machine, was adopted as the standard training aeroplane for the Royal Flying Corps and the Royal Naval Air Service. In 1918 these two branches of the Services were merged and became the Royal Air Force. The 504 trainer also found favour abroad, and even to-day, 26 years after the Avro 504 was originally created, hundreds of its lineal descendants are still in use all over the world. It is claimed that more airmen have learned to fly in Avro 504 biplanes than in any other type of training aircraft.

Reference to all the many types of military and civil aircraft designed and produced by the Avro company would make this article into a catalogue, and therefore only certain outstanding or specially interesting types will be mentioned.

The great demand for Avro 504s and later modified versions caused the company to rent part of a large engineering works in Manchester, for additional working space. Production there reached a peak of 70 aeroplanes a week, and companies all over the country with wood-working experience were set to work producing parts, and in some cases complete aircraft. In the meantime construction of a large new factory was commenced, but by the time it was completed early in 1919 the war was over. In this new factory the company stored scores of Avro 504K aeroplanes which had been produced in excess of Government requirements. Then a use was found for some of them. Hundreds of pilots had been released from the R.A.F. without training or inclination for any job but flying. The Avro company engaged the services of a large number of them, equipped them with 504K aeroplanes modified to carry pilot and two passengers, and stationed them, together with technical and clerical staffs, at all the chief seaside resorts to give "joy flights." Passenger flights became popular among the holiday-makers, and more than 200,000 people were carried without accident. After a while many of the pilots saved enough money to buy their aeroplanes and formed their own organisations for giving joy flights, and gradually the Avro company gave up this kind of work.

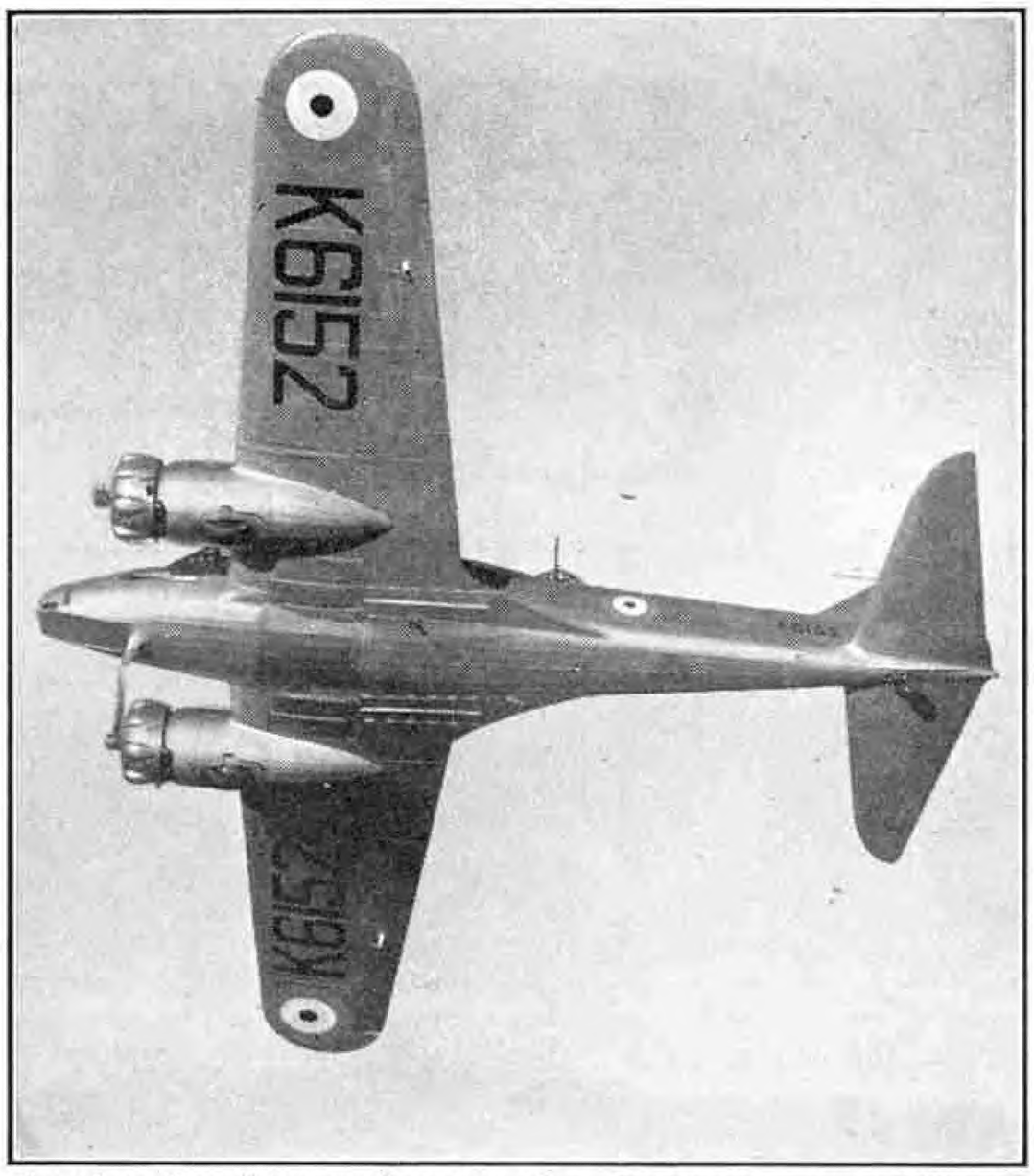
One of the company's early post-war types was the Avro "Baby," originally designed and built as a single-seater and later developed as a two-seater. The wing span of this biplane was only 25 ft., and the gross weight 870 lb.; it could reach 80 m. p. h., and distinguished itself in sporting events. An interesting fact is that the first Avro "Baby" had the identical 35 h.p. water-cooled Green engine that had been fitted in A. V. Roe's 1910 triplane. In 1919 the late Squadron Leader H. J. L. Hinkler, familiarly known as "Bert," who became famous for his record flights in small, light aircraft, won the Aerial Derby Handicap in a "Baby" biplane, and in the 1920 Handicap machines of this type finished first and second. In May 1920 Hinkler flew an Avro "Baby" non-stop from Croydon to Turin, about 700 miles. in 9½ hrs., and in the following year this Australian airman flew the same machine non-stop from Sydney to Bundaberg, his birthplace, a distance of about 800 miles, in less than 9 hrs. Again flying an Avro "Baby," Hinkler won the Grosvenor Challenge Cup in 1923. About this time he joined the Avro company as a test pilot, and he remained with them seven years.

In 1921 the company were commissioned by the late Sir Ernest Shackleton to construct a special seaplane to be carried on his exploration ship "*The Quest*" to the Antarctic. This seaplane was a development of the Avro "Baby," with special wings and fitted with an 80 h.p. Le Rhône engine. The external bracing of the main planes was so arranged that these could be easily dismantled, and no rigging was necessary. Sir Ernest Shackleton died at sea during the voyage south, and the aeroplane was never used for its original purpose. Eventually it was sold and used for seal-spotting in Newfoundland.

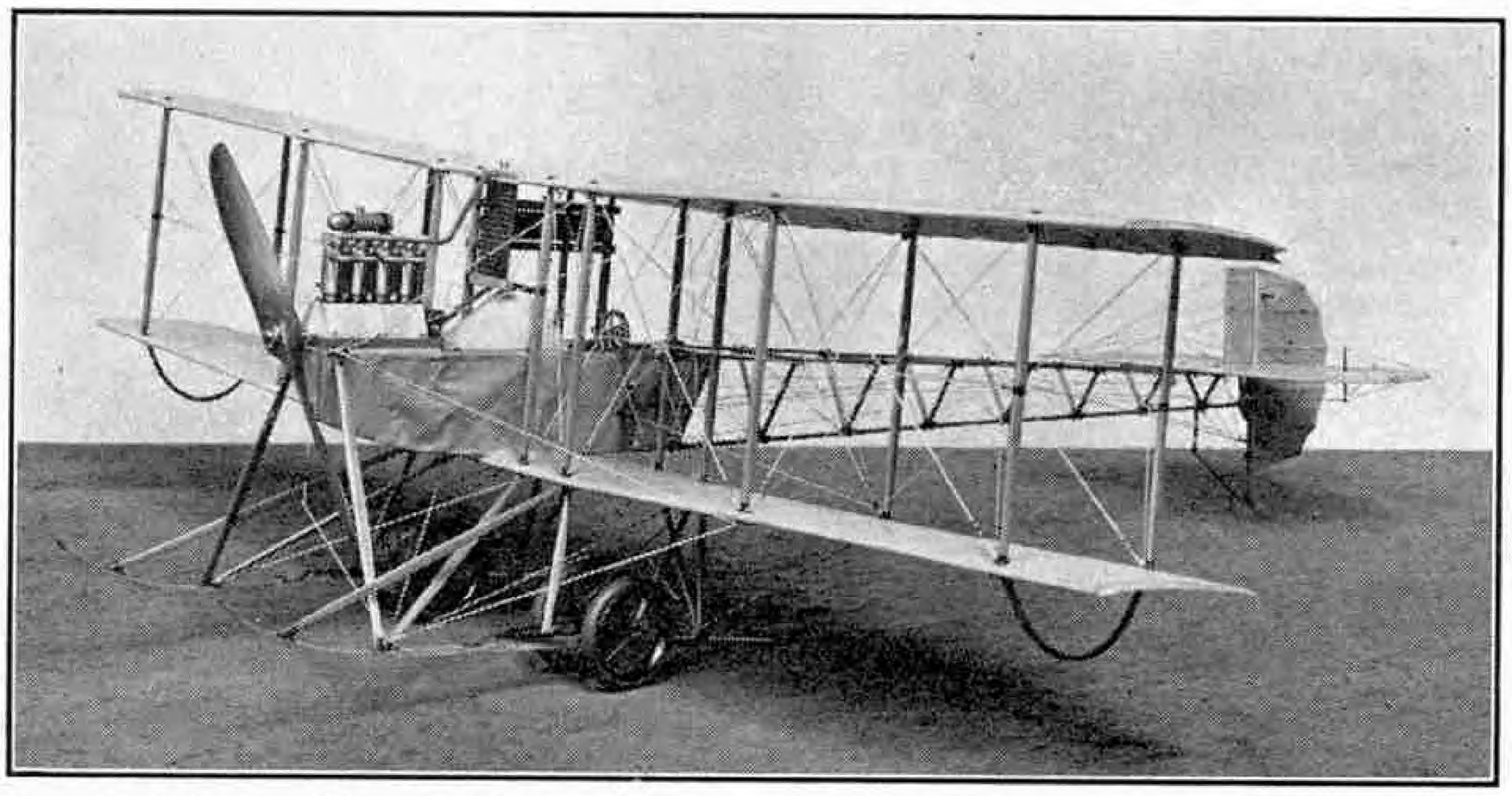
The partial re-equipment of the greatly depleted post-war Royal Air Force gave the Avro company an opportunity to put forward a new military aeroplane, and the "Aldershot" single-engined bomber was designed and built experimentally. It was the first Avro aeroplane to have a metal fuselage, and was fitted with a 650 h.p. Rolls-Royce engine. It had a top speed of 108 m.p.h. when carrying a crew of three, 1,735 lb. of bombs and armament, and enough fuel for 6 hrs. flying. The machine proved such a success that the Air Ministry ordered a large number. In 1922 the "Aldershot" was fitted experimentally with a 1,000 h.p. Napier "Cub" engine, and then became the most powerful single-engined aeroplane in the world.

Another successful Avro military biplane of that period was the "Bison," designed for fleet gunnery spotting. It had a 450 h.p. Napier engine and could attain a top speed of 108 m.p.h., with a crew of four. Hooks were fitted on the undercarriage axle to facilitate landing on the decks of aircraft-carrying ships. Many of these machines were supplied to the Fleet Air Arm.

The Avro "Avian" biplane, which first appeared in 1926, became one of the best known light touring machines, and was produced in large quantities during the succeeding five years. At first "Avians" were built entirely of wood, but later the type was re-designed with a welded steel fuselage. In 1928 Hinkler flew an "Avian" from England to (*Continued on page 718*)

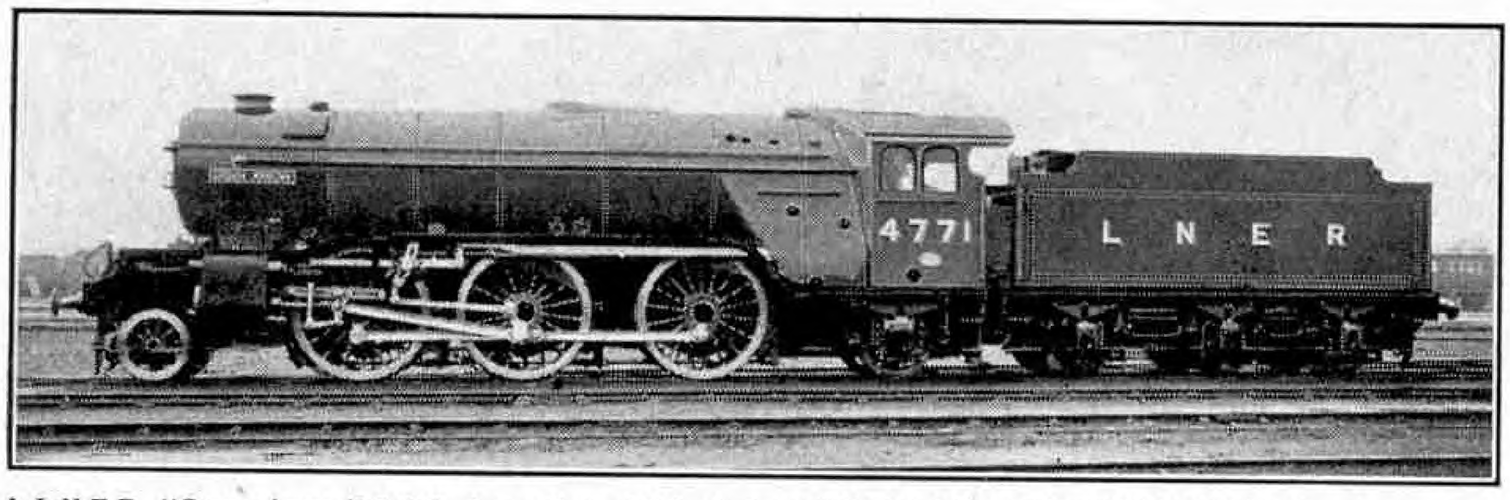


The "Anson" coastal reconnaissance aeroplane. Photograph courtesy of "Flight."



A model of the Avro biplane of 1911. Note the skeleton fuselage, exposed engine, and extensive bracing of the wings and tail unit. Photograph by courtesy of the Director and Secretary, Science Museum, London.

RAILWAY NEWS



A L.N.E.R. "Green Arrow" 2-6-2. An engine of this class recently hauled a train weighing 721 tons, as explained in the note by R. A. H. Weight on this page.

Giant Wartime Expresses

By direction of the Railway Executive Committee which, for the duration of the war, controls the British systems on behalf of the Minister of Transport, drastically reduced and decelerated train services were introduced on 11th September over all main lines in order that the companies might be prepared for handling any emergency eventuality. The combining of several normal services into one semi-fast train resulted in new records being attained in the way of passenger train weights, even upon the East Coast Route, which in recent years had become famous for vast loading. Express trains weighing up to 600 tons or more loaded have been reported upon a number of occasions, particularly on the G.N. section.

The absolute record of 661 tons tare that was attained some years ago by a Sunday arrival at King's Cross, hauled by "*Prince Palatine*," one of the original "A1 Pacifics," was certainly not expected to be surpassed in a hurry, if ever. The present emergency, however, has produced an ordinary express over the same south-bound route weighing no less than 706 tons empty, or fully 750 tons loaded. Several others were made up to 19 to 21 corridors, plus a van or two, which turned the scale at round about 650 to 725 tons full, the engines being "Pacifics," of all three classes, or "Green Arrow" 2–6–2's. Even these gargantuan figures were surpassed the other day when a huge special train of troops and equipment weighed no less than 721 tons tare! This was heavier than many fast freight trains, and constituted a decided new record for British passenger train loading. The locomotive cheerfully tackling this load was 2–6–2 No. 4816, manned and stationed at King's Cross.

Generally speaking, after the services were gradually amplified in October average loads became a little more reasonable, with trains more compatible with maximum platform lengths. Average start to stop speeds in the majority of cases have for the time being been reduced to about 45–50 m.p.h.

R. A. H. Weight.

Traffic Working in Wartime

Since 3rd September 1939 traffic conditions on British railways have undergone a very complete change, from the hectic, yet happy circumstances of the late summer holiday season to skeleton passenger services by day and vast, yet furtive freight movements in the black-out. Among special traffic occasioned by the war first and foremost, both in magnitude and importance, was the transport of the British Expeditionary Force to the ports of embarkation. Unlike the corresponding movement of the war of 1914–18, this involved an enormous amount of goods traffic, the only evidence of which was a sustained rumble of heavy trains passing in the dead of night. Then again severe and frequent air raids were expected in the early days of the war. Passenger train services therefore were cut to the very minimum to lessen the dislocation that would result from damage to trade, and to reduce the chances of heavy casualties.

The revised passenger train services have brought about widespread changes in locomotive workings. The maximum start to stop speeds booked are about 45 m.p.h., so that maximum speeds rarely exceed a mile a minute. At the same time all restaurant cars were withdrawn, though these have now been restored on the majority of trains, and train loads in the first few weeks of the war were not unduly heavy. In consequence a number of the crack express passenger locomotives, particularly on the L.M.S. and L.N.E.R., were "rested," and the wartime long-distance trains, which could scarcely be called "expresses," were entrusted to less powerful, or mixed traffic engines. The "Green Arrow" class 2–6–2s on the L.N.E.R. have done yeoman work, while on the L.M.S. the "Royal Scots" seem to have borne the brunt of the main line passenger workings. Pacifics were for a time distinctly rare even at King's Cross, and those that did appear were mainly the older non-streamlined examples.

As matters have become more settled, more trains have been put on and restaurant cars have been restored. In view of the enormous amount of freight traffic being carried, however, it is doubtful whether any further improvements or speeding up will be possible. Around the big industrial centres the railways would seem to be worked almost to their full capacity at times.

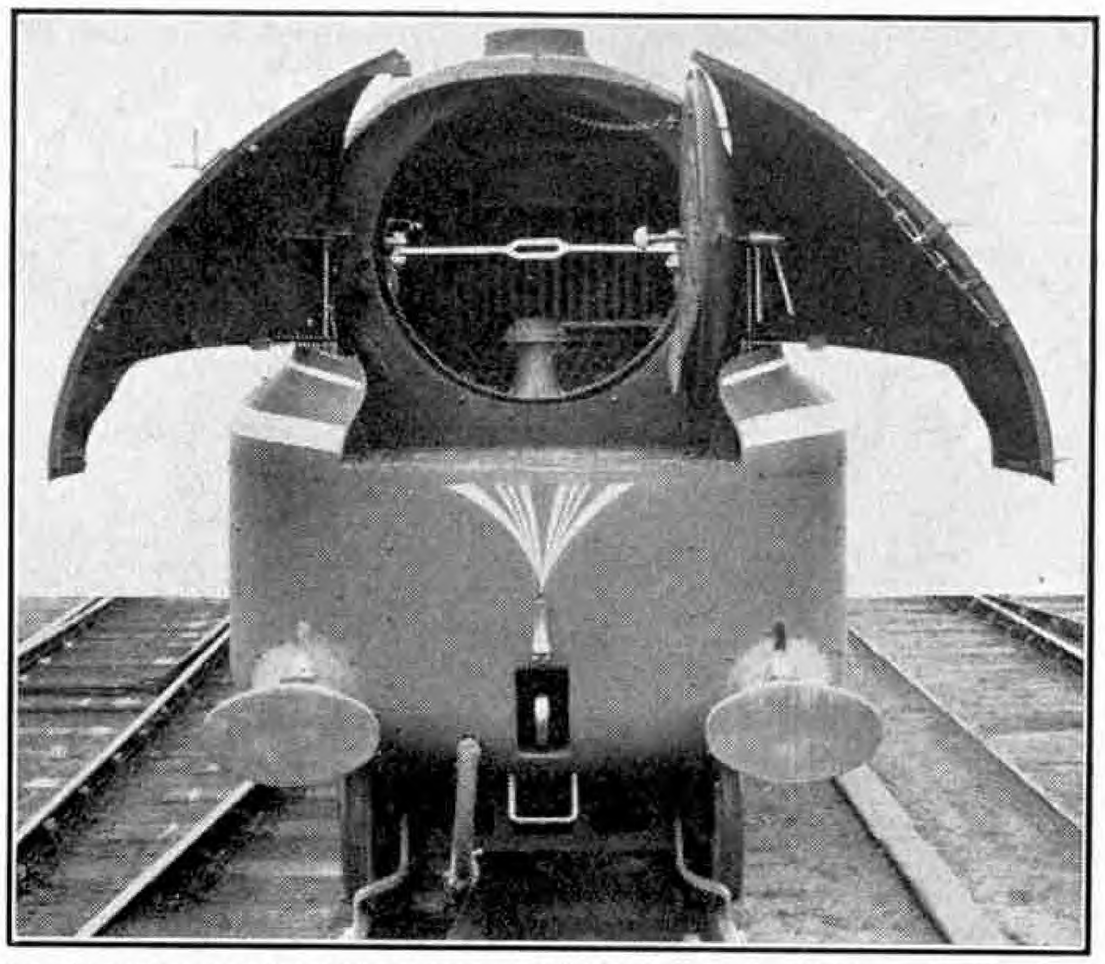
It is not only on the operational side that the British railways are carrying on. Many important engineering projects, sanctioned long before war broke out, are being pushed forward. Every scheme of development that will assist in getting traffic through is of vital importance now, and in every case the engineers are going ahead. As in the war of 1914–18, it is probable that a large number of British locomotives will be sent overseas for use with the B.E.F. As it is likely that the majority of these will be of the 2–8–0 type specially successful on the previous occasion, it will be interesting to see how the increased freight traffic at home is hauled, with suitable locomotive stocks somewhat depleted. There are many passenger types that can, if need be, give an excellent account of themselves on the lighter and faster goods services, and the actual working will be particularly interesting to observe.

O. S. Nock.

* * * *

The Illinois Central Railroad is to place orders for new equipment including 1,500 coal cars, 1,000 box cars and 10 Diesel-electric shunting locomotives. The Diesel-electric locomotives will be used instead of steam locomotives at the Chicago terminal station.

At the end of this year it is anticipated that some 60,000 new freight cars will be placed in service in America.



"Engine with wings." L.M.S. 4-6-2 No. 6220 "Coronation" with streamlined casing and smoke-box door open to allow inspection of smoke-box.

G.W.R. Train Control Scheme

The G.W.R. announce that with the fitting of the last ramp at Penzance last month the installation of automatic train control throughout the main line routes between Paddington and Penzance, Fishguard and Chester was completed. Every train running over these 2,852 miles of line is now under the control of this "invisible hand," which operates throughout the 24 hours of every day, guiding trains to their destination in all weathers with the least possible delay.

The G.W.R. automatic train control system, which was invented by members of the staff, gives the engine driver an audible warning in his cab of the position of each "caution" signal about to be passed. If the line is clear, a bell rings. If a signal is at "caution," the driver is warned by the note of a siren and the brakes are automatically applied throughout the train. Tests have proved that at 60 m.p.h. a train can be brought smoothly and automatically to a standstill in 900 yds., or 450 yds. before reaching the "stop" signal.

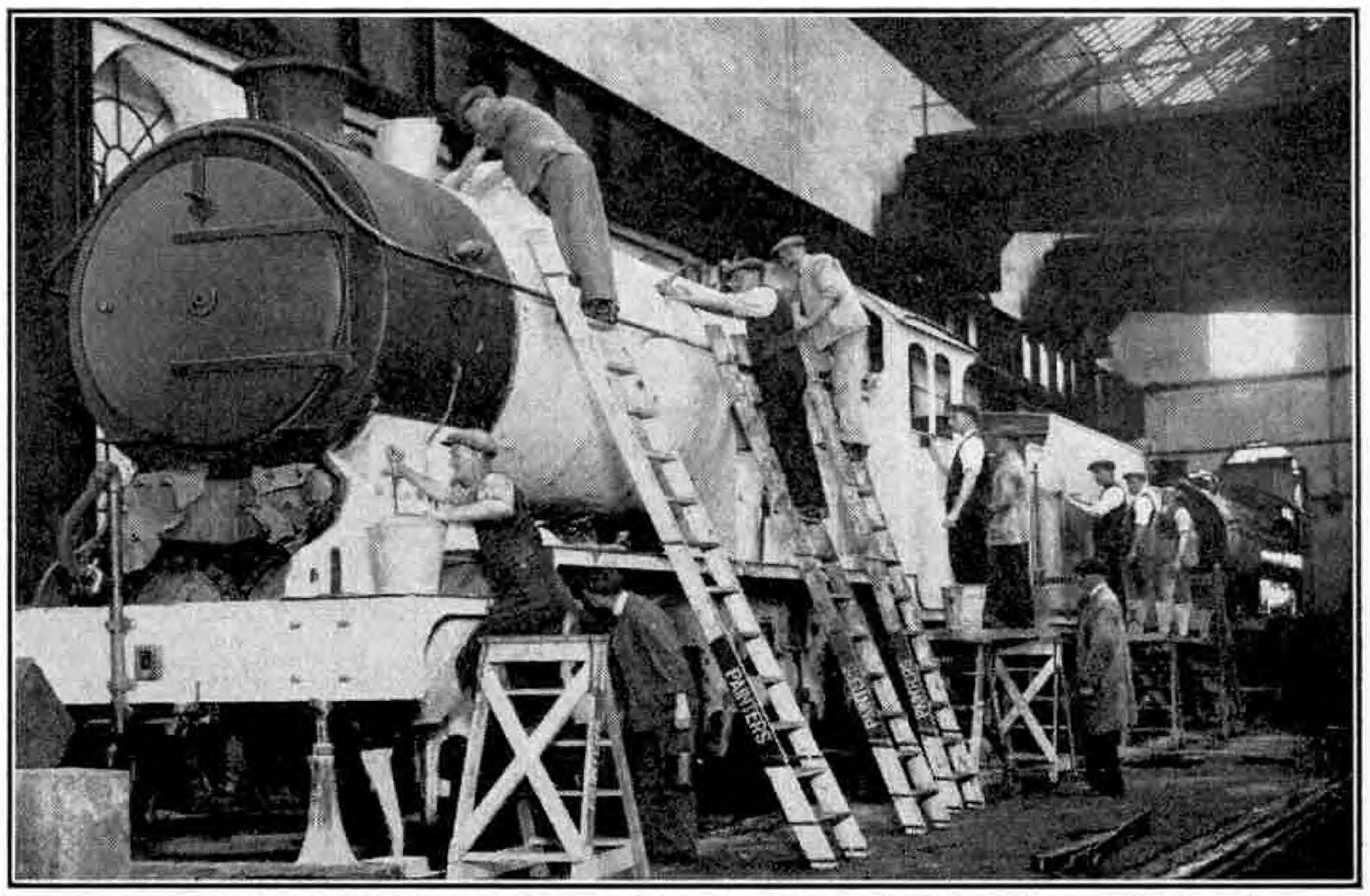
A Shock for the Fireman!

A recent issue of the *"Railway Gazette"* tells an amusing story of the blackout. On a dark night at a certain locomotive depot the fireman of an engine that was being coaled was startled by a sudden loud roar. He then discovered that his tender was being loaded with large iron pipes from the chute above it! In the darkness the men in charge of the coal stage had not noticed that among the wagons of engine coal was one loaded with pipes.

L.M.S. Station Gardens

Although with the announcement of this year's results, the L.M.S. Railway's station gardens competition is being suspended "for the duration," the company is urging their staffs to continue to do their best, consistent with wartime conditions, to maintain the neatness and tidiness of stations, at the highest possible level.

This year's L.M.S. station gardens competition attracted a record entry of 489 English and Welsh stations, and the four premier awards of "special" prizes have been allotted to Alsager (Cheshire), Buckingham, Llanfairfechan, and Knighton (Radnorshire). First prizes have been won by Alcester, Berkeley Road, Charfield, Gisburn, Malpas, Reddish, St. Asaph and Walthamstow.



A new L.N.E.R. "J39" 0-6-0 receiving one of its many coats of paint before being passed into service.

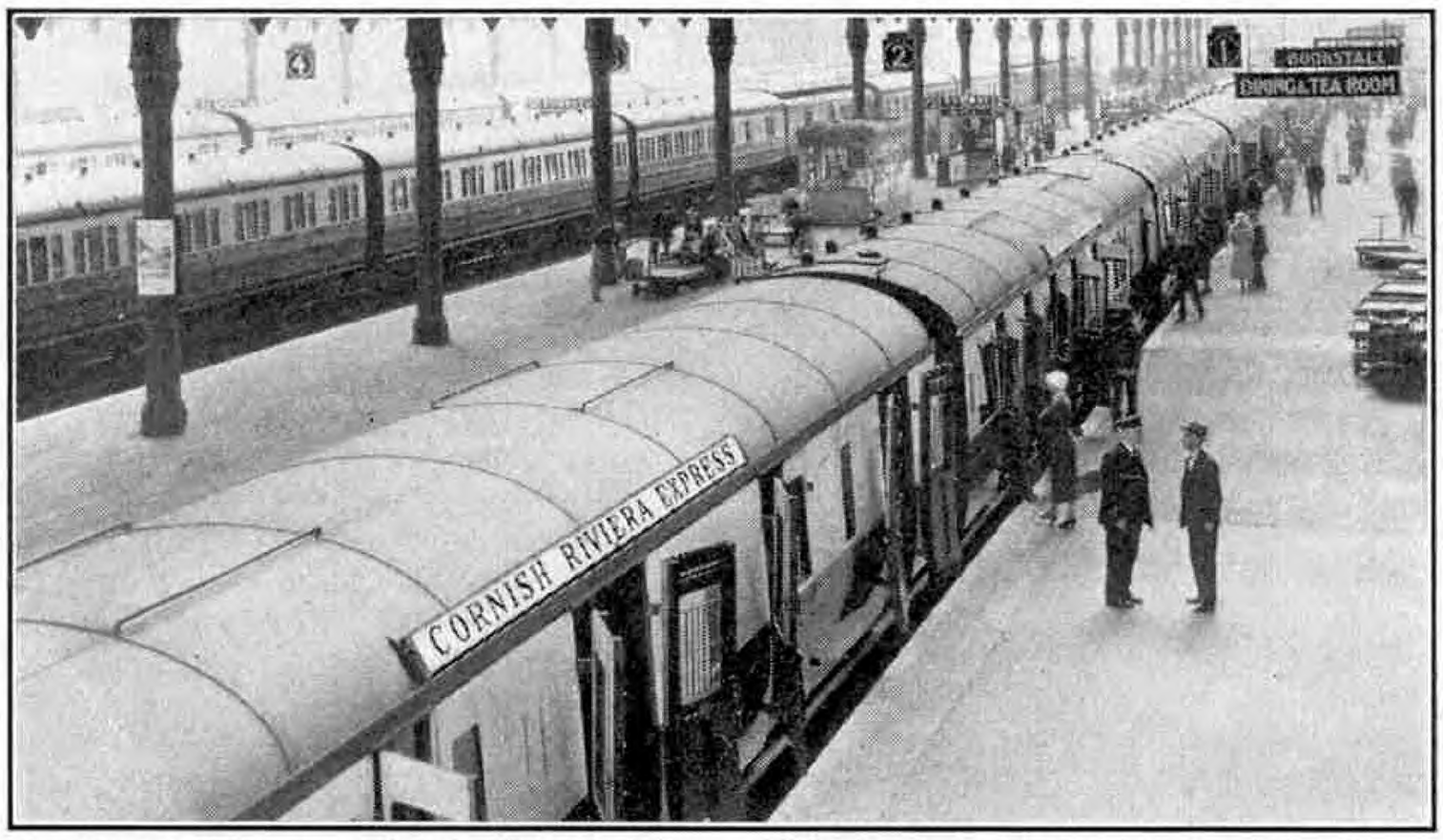
Time Recovery with 630 Tons on the L.N.E.R.

On a busy Sunday last summer the 5.20 p.m. express from Newcastle to King's Cross was worked through by streamlined "Pacific" 4488 *"Union of South Africa"* in charge of Driver Ferguson, of Gateshead shed. The load was above normal, 425 tons all found, as far as Doncaster, and when the augmented Harrogate, Leeds and Bradford portions were there attached, the train became a huge one of 18 cars, weighing full no less than 630 tons! It was a fine effort with such a load to cover the 17.4 miles on to Retford in 20½ min. start to stop, speed reaching 53 to 50 m.p.h. on the initial Pipers Wood rise and being sustained at 68 to 70 m.p.h. on the slight descent beyond Bawtry.

The schedule on to London allows 155 min. for 138.6 miles non-stop, so that there was some recovery margin, though in the circumstances it was hardly to be expected that the efforts in this direction would be so outstanding. On getting away from Retford, 15 min. late, 43 m.p.h. was attained up the 1 in 178 incline. Speed rose to 77 m.p.h. down Weston bank, which is mostly at 1 in 200, and was maintained at 68 m.p.h. beyond Newark after entering upon the rising stretch towards Stoke. From a slight slowing to 55 m.p.h. No. 4488 recovered to 61 m.p.h. before Hougham, and then gradually fell to a minimum of 51 m.p.h. at Peascliffe. The engine accelerated to 58 m.p.h. through Grantham, and topped Stoke summit after the final 5½ miles at 1 in 198 at 45 m.p.h., having averaged 54 m.p.h. along the 15 rising miles from Claypole. During a fast descent of Stoke bank 88 to 89½ m.p.h. was the maximum sustained. Then Peterborough was passed at the usual crawl, the time from Retford, where 8½ mins. had already been recovered, being 62½ min. for 62.2 miles.

Bad signal delays later supervened at the foot of the two principal climbs, Abbots Ripton and Stevenage banks, from which good recoveries were made uphill with this 630-ton train. The average of 72.2 m.p.h. maintained over the 22 slightly undulating miles between Huntingdon and Arlesey was particularly notable, and so was the minimum of 60 m.p.h. at Potters Bar, separating maxima of 75 m.p.h. before Hatfield and 78 m.p.h. near New Southgate. The actual time into the terminus following another signal delay was 150 min., 5 min. under schedule, but as the signal slowings had cost 13 to 14 min. the speed from Retford had averaged all but 61 m.p.h. If there had been no check the whole of the 15 min. late start would have been recovered!

R. A. H. WEIGHT.



The "Cornish Riviera Express" alongside No. 1 platform at Paddington just before departure time. This train now makes the longest regular non-stop run in Great Britain.

New L.M.S. Electric Trains

Last month the first of the new electric trains for the Liverpool–Southport service were placed in traffic. Compared with the old trains which have been running for many years, the new trains are luxurious. They approximate closely to those running on the Wirral Section of the L.M.S. and among other refinements they have automatic sliding doors. It will be some time before the line is completely equipped with these trains.

HOW THINGS ARE MADE:

Collapsible Tubes

By E. Gurd

ASK your friend what he knows about collapsible tubes, and he will probably answer: "I used one when I squeezed out my tooth paste this morning." That probably is the sum total of popular knowledge, yet many thousand workers are employed in producing these tubes and almost countless millions enjoy the boon they provide.

Collapsible tubes are nearly a century old. They were invented in England in 1841, and except for an accident might well have disappeared in the limbo of forgotten things. The inventor was an artist, John Rand, and his object was to "preserve paints . . . by confining them in closed metal vessels." It is interesting to record that after nearly 100 years a better method has yet to be evolved.

Early tubes were crude and were manufactured in two pieces, the "vessel" or body, and the top, which was made by pressing. The two were afterwards joined together by solder, and this method might have persisted had not some careless workman produced a set of "sloppy" fitting tools, which were discarded as inefficient. The tools were more fortunate than the workman, for they were kept, and one day someone thought he might see if a job could be got from them. They were fitted up, a piece of metal was fed in to form a collapsible tube top, and pressure was applied. The ductile metal shot up the tool, and in a trice someone stumbled to fortune, for the first almost complete collapsible tube was made.

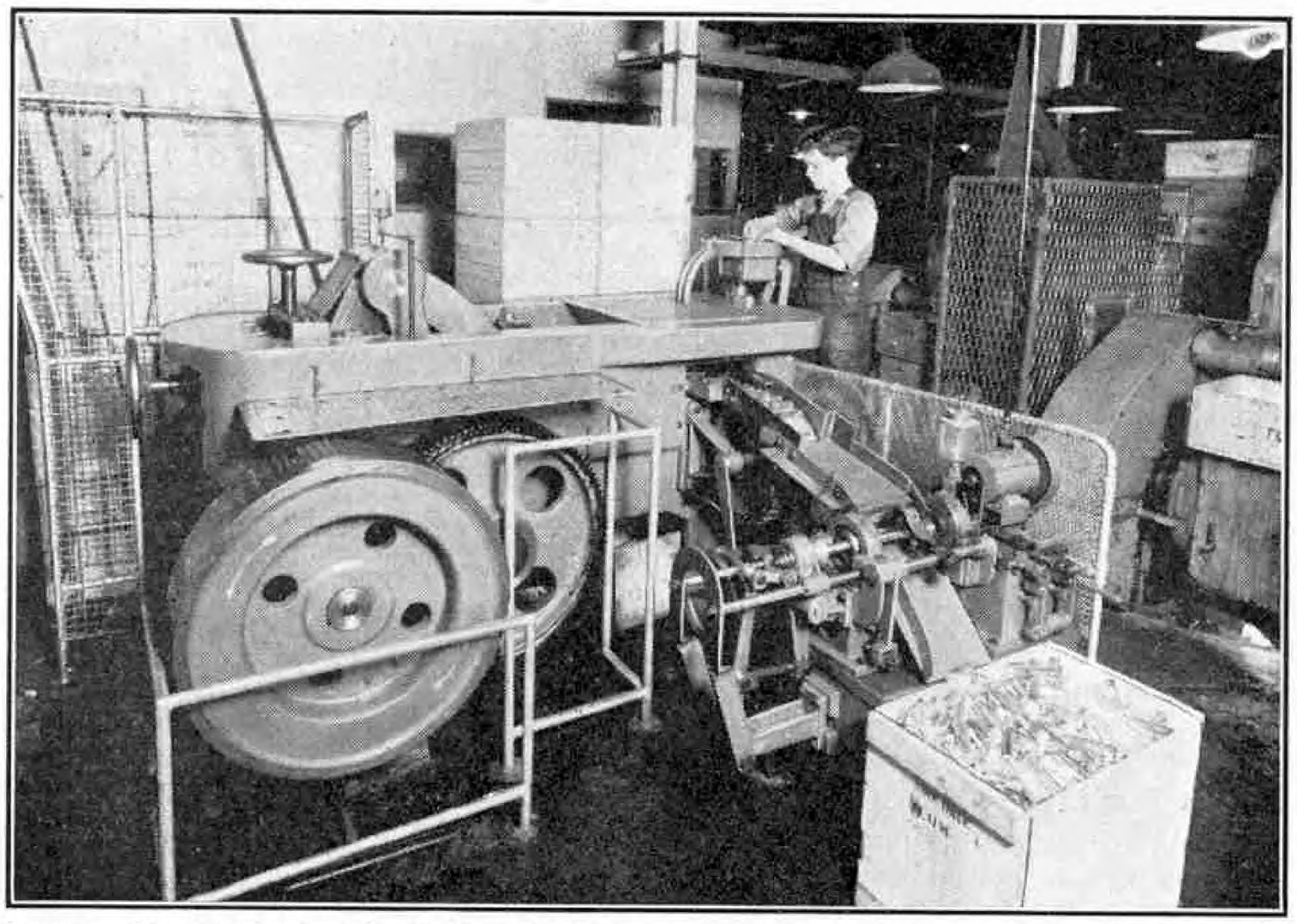
There is documentary evidence that artists' colour manufacturers were using tubes prior to 1845, but apart from this only meagre information of their early application is available. Certain it is, however, that a kind of perfume was packed in this manner, and the tubes became very popular at fairs, where they were filled with water and called "Ladies' Tormentors" and other names! Dunlops were among the pioneer users, for they put up a collapsible tube of solution for sticking patches, and the packing of Colgate's Dental Cream in tubes goes back 50 years. It is estimated that more than 120 articles of food are now packed in collapsible containers, as well as an almost endless variety of cosmetics and pharmaceutical articles. The consumption figure for America, where tubes are fairly well exploited, is quoted as half a billion annually.



Decorating the tubes by a printing process. Photograph by courtesy of Timsons Ltd., Kettering and London.

Much has happened to collapsible tubes within our lifetime. Almost until the turn of the century any printing on them was hand stencilled, and it was not until 1912 that the present method was developed. The rate of extrusion has grown from half a gross per hour to 18 gross in the same period. Complete mechanisation in manufacture has only been recently achieved in one plant, which is claimed to bring the time cycle to just under an hour, instead of from two to four days.

The modern collapsible tube passes through a considerable number of processes before it is ready to receive any commodity, and there are about 60 "standard" sizes, as well as variations in neck sizes, neck openings, caps, cap materials, and bottom closures. It is produced from lead, tin-coated lead, tin alloyed with a small proportion of copper or other suitable stiffener, and aluminium. Tin tubes are intended for any product to be taken internally or used on the body, as the metal is chemically inert. Aluminium serves similar purposes and has the additional advantage of light weight, but requires certain research to make absolutely sure that it is suitable for any product, especially one containing alkalies. Lead, known as lead alloy, is used for tubes where the contents are not intended for personal application, and tin-coated tubes, which have a lead alloy base with a thin covering of tin, may be



Producing collapsible tubes from circular blanks. Each tube is formed at one stroke of a press in a fraction of a second. For this illustration and that on the opposite page we are indebted to John Dale Metal Containers Ltd., London.

used in substitution for any of the others.

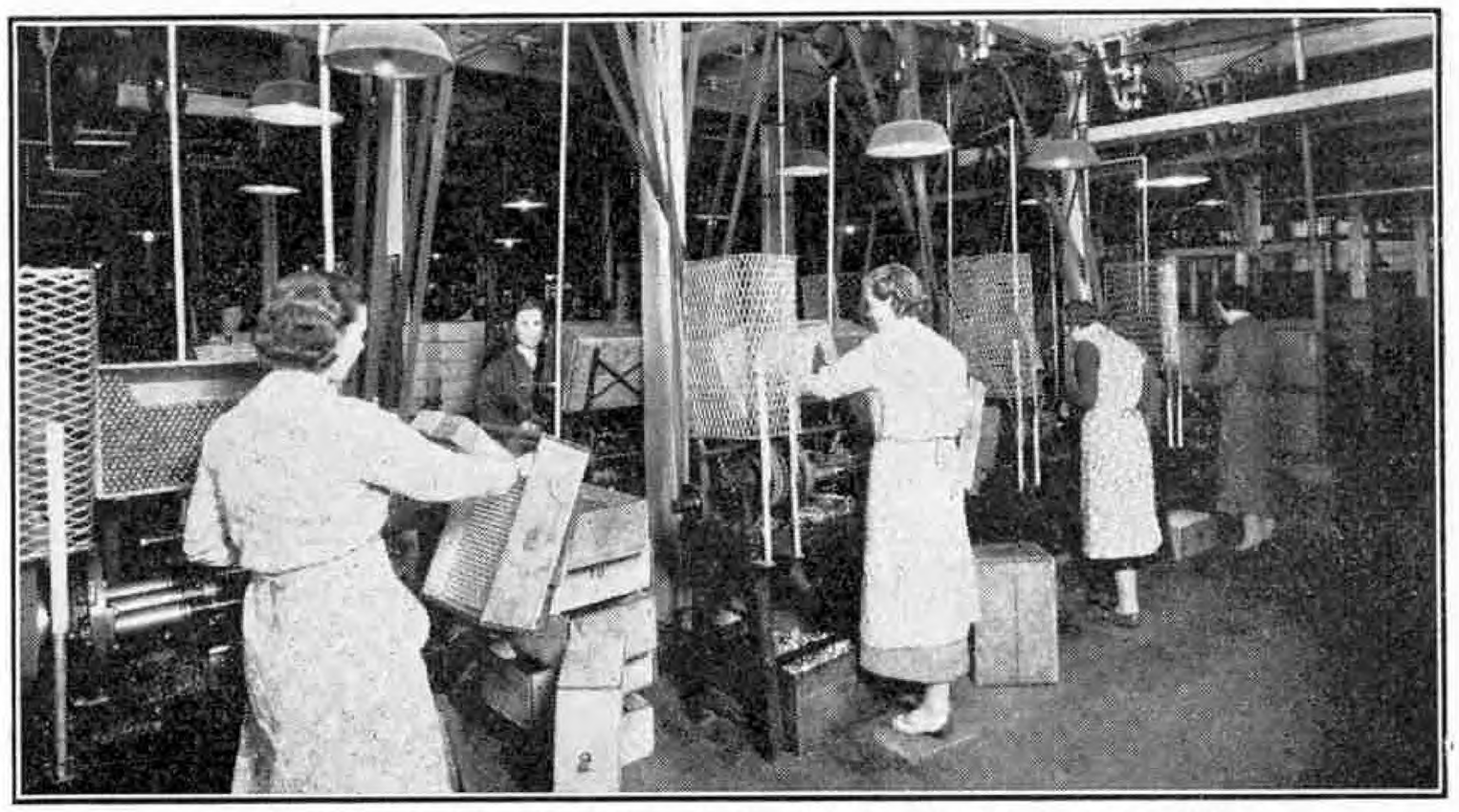
The first process in making a tube is to roll a metal ingot into strip. Some rolling mills are capable of plating tin on to lead sheets, in which case the tin is rolled out first to a thickness of about .003 in. Then follows blanking, in which discs, frequently called "dumps," are punched out of the strip as this advances through dies. An automatic feed ensures regular travel so that all the blanks, which are roughly as big as a shilling, are identical in size. The gauge of strip used is determined by the length and wall thickness desired, and the dump sizes have to allow for clearance and free working in the tools.

The hole that appears in the top of the finished tube is then made in the dump, and the next stage is to produce the tube itself by impact extrusion in presses exerting a pressure of from 30 to 300 tons, or even more, according to the size and nature of the tube made. The press shown in the lower illustration on the previous page is one of several types, for the design may be horizontal or vertical, and the essentials are strength and rigidity to stand the severe stresses imposed at the moment of impact.

Each tube is produced by one stroke of the press on a cold dump placed in the die, the hole in the dump registering on a pin projection on the press tools. The operation is completed in a split second as the press ram reaches the bottom of the stroke, the metal squirting up between the ram and the die, flowing far too speedily for the eye to follow. The heat generated both in the extruded part and in the tools does not permit touching the formed article with bare hands at the completion of the operation. Two methods of stripping the tube from the tool are commonly employed. Compressed air is used for containers with sealed ends, and the alternative is the application of metal strippers, which are so arranged that they do not foul the tube.

Impact extrusion is entirely different from the process usually called "extrusion," in which successive drawings for depth or continuous pressures are employed. Impact extrusion produces a virtually finished job. The tools have to be exceptionally well made, and the surfaces that come into contact with metal receive a mirror polish so as not to retard free metal flow. The shoulder end of the container is produced exactly to the form of the die, and the wall thickness is controlled by the punch pressing edge and the internal diameter of the die.

The next operation in the work cycle is trimming to length, as it is impossible to extrude to an exact measurement; and as a further operation the projection intended to take a cap is threaded externally. The illustration on this page shows the trimming and threading process. The tubes are put on a mandrel by hand, the operations are completed automatically, and the attendant removes the finished tube.



Trimming the tubes to length and threading the projection on which the cap is to be fitted.

The two following processes are known as decorating. The first is to coat or "paint" the collapsible tubes with enamel, a semi-automatic process in which the mixture is applied all round the tubes by rollers. For this purpose the tubes are hand inserted on a mandrel, and are removed after coating. They are then placed on vertical pegs so arranged on a tray that one tube will not touch another.

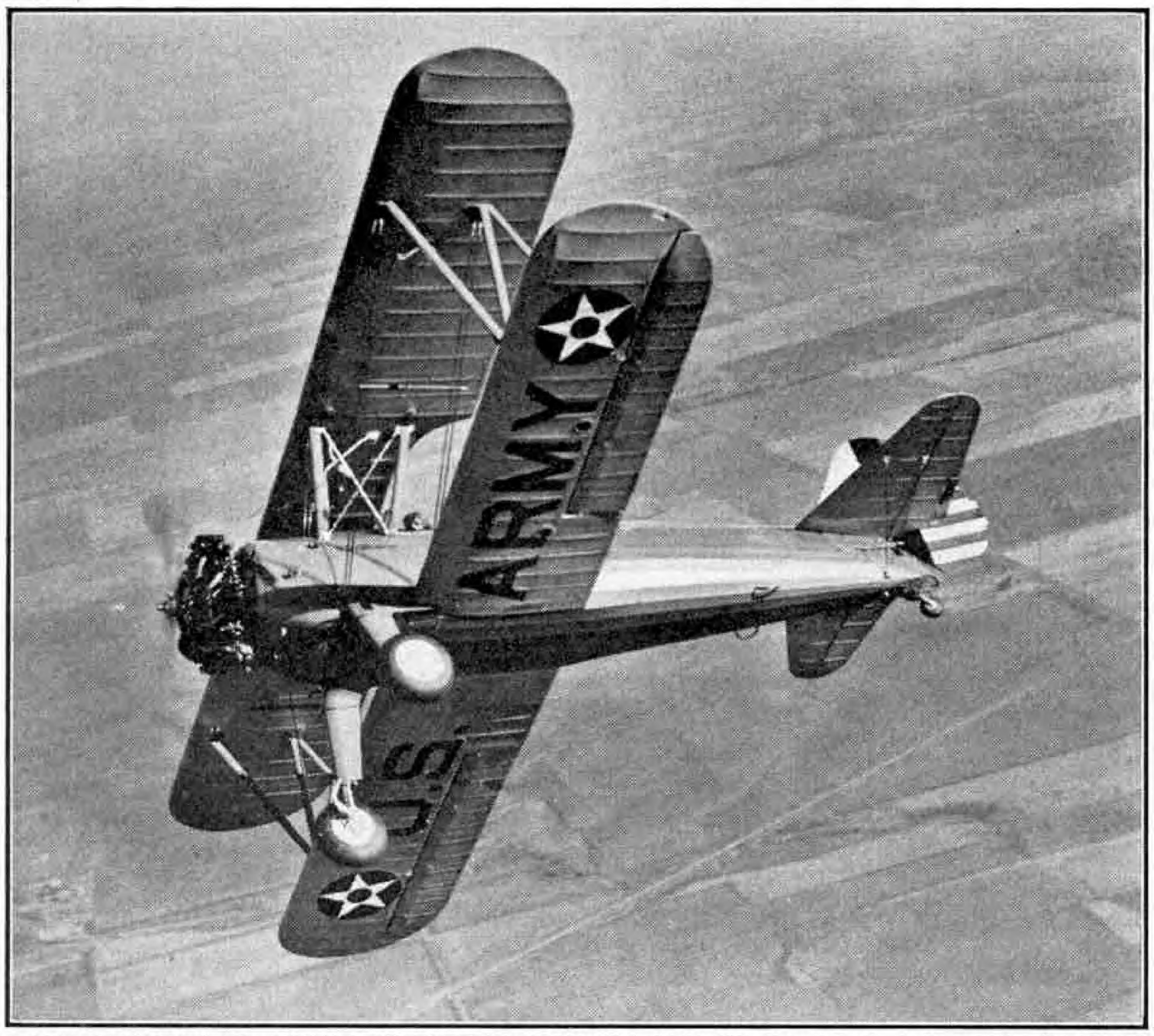
Tubes that are to be delivered plain-coated are dried. Others are ready for printing as soon as the enamel has reached a proper state of tackiness. The printing process may be in from one to four colours, and the press that performs this delicate operation is shown in the upper illustration on the opposite page. It will be seen that this is another semi-mechanical operation. The tubes are loaded on to a revolving turret, which advances each tube, properly supported, to the printing station, and immediately afterwards the tubes are removed to pegged trays, and finally stoved for drying. Girls acquire such dexterity in printing that as many as 40 tubes can be printed in a minute.

The printing machine shown in our illustration is a multi-spindle type, but there are variations in which only one or two spindles are employed, as well as plant for mechanical handling that takes the tubes through the coating, printing and drying operations without human labour. The conveyor system is then employed for moving tubes from one operation to the next. Sometimes tubes are varnished as a final operation, and certain tubes, particularly aluminium, may be coated inside with a suitable lacquer to prevent the contents from attacking the metal.

While these various processes are going on, the tops are made. These may be of metal, in which case they are pressed; or of a plastic material, when they are moulded. Plastic caps are in the majority to-day. These are produced in practically all colours, and are made round, hexagonal, or octagonal in shape. Frequently too they are supplied with cork or similar liners to meet special sealing problems.

A calibrated collapsible tube that permits dosage measurement has been produced recently in America. This promises interesting developments, and "one shot" tubes, containing enough material for use on one occasion, are finding considerable favour.

Collapsible tubes are usually delivered to the user with the caps affixed, and ready for filling. They are filled from the bottom, and the base is secured by a clipless closure, or by a clip, according to the commodity.



A striking photograph of a Stearman PT-13A training biplane in flight. This type is extensively used by the United States Army Air Corps. Photograph reproduced by courtesy of the Boeing Aircraft Company, U.S.A.

Air News

More Trainers for United States Army Air Corps

The Stearman Aircraft Division of the Boeing Aircraft Company have received an order for PT-13A primary training biplanes that is said to be the largest ever placed by the United States Government for a single type of aircraft. The new machines are for the Army Air Corps, in which the type is already standard equipment. One of these very efficient PT-13A trainers is shown in the illustration on this page.

Another type of primary trainer that has been ordered in large numbers by the United States Government is the Ryan YPT-16, a military version of the Ryan S-T single-engined low wing monoplane. The military type has two open cockpits arranged in tandem. The contract resulted from the outstanding performance of the machine at a flight competition of primary training aircraft held at Wright Field, Daytona.

In addition to designing and constructing aircraft the Ryan Aeronautical Company run a School of Aeronautics at San Diego, California, and this organisation is one of nine that have been selected for the primary flying training of members of the United States Army Air Corps.

The British Transatlantic Air Service

The British transatlantic air mail and passenger service ceased at the end of September last until next summer. The service began in August and during the two months that it operated 16 flights were made, eight in each direction. The Imperial Airways flying boats *"Cabot"* and *"Caribou"* were used, and on the last westward trip of the season *"Cabot"* set up a new record for a flight between Foynes, in Eire, and Botwood, in Newfoundland, by accomplishing the ocean crossing in 13 hrs. 2 min. This is 20 min. less than the previous record, made in 1938 by the seaplane *"Mercury,"* the upper component of the Mayo composite aircraft.

The total freight carried on the eight westward flights was about 6,000 lb., and on the eastward, or return, flights approximately 7,000 lb. Mid-air refuelling of the flying boats after taking-off from Foynes and Botwood did not prove necessary on every flight, but whenever carried out it was satisfactory.

Test Flying the Lockheed "Lodestar"

The Lockheed Aircraft Corporation, of California, have begun test flying the first Lockheed "Lodestar," a new commercial air liner designed specially to meet the requirements of American air transport companies. It was taken up for the first time by Marshall Headle, the company's chief test pilot, who was accompanied by a flight research technician. This preliminary flight lasted about 1 hr., during which the aeroplane circled over the San Fernando Valley, near the Lockheed factory, and afterward the pilot gave a very satisfactory report upon the performance of his new charge.

The "Lodestar" is a twin-engined all-metal monoplane arranged to carry two pilots, a stewardess, and 14 passengers. Baggage can be carried in the underside of the fuselage, ahead of the wing intersection, and in three smaller compartments below the cabin floor. The calculated top speed of the air liner is 236 m.p.h., and the range is 1,150 miles at a cruising speed of 218 m.p.h.

The French Atlantic "Weather Ship"

The French steamer *"Carimaré,"* of Air France-Transatlantique, which is specially equipped to act as a "weather ship" to the French pilots flying across the Atlantic by the Azores route, has returned home after a second spell of duty in her position between the Azores and Portugal.

When the ship is at her station small pilotless balloons, to which special instruments and automatic radio transmitters are attached, are sent up to a height of 60,000 ft. As each balloon ascends the transmitter at intervals sends down to the ship signals that give information concerning the barometric pressure and other conditions of the upper air.

Television Aids Air Reconnaissance

Experiments carried out in Italy with reconnaissance aircraft fitted with television transmitters are stated to have been successful. The idea is that transmitters should enable the crew of a reconnoitring aeroplane to send out instant pictorial reports of the work accomplished, so that Field Headquarters do not have to wait until the aeroplane returns, and then hurriedly develop the photographs to obtain the desired information.

Pan American Airways Order more Flying Boats

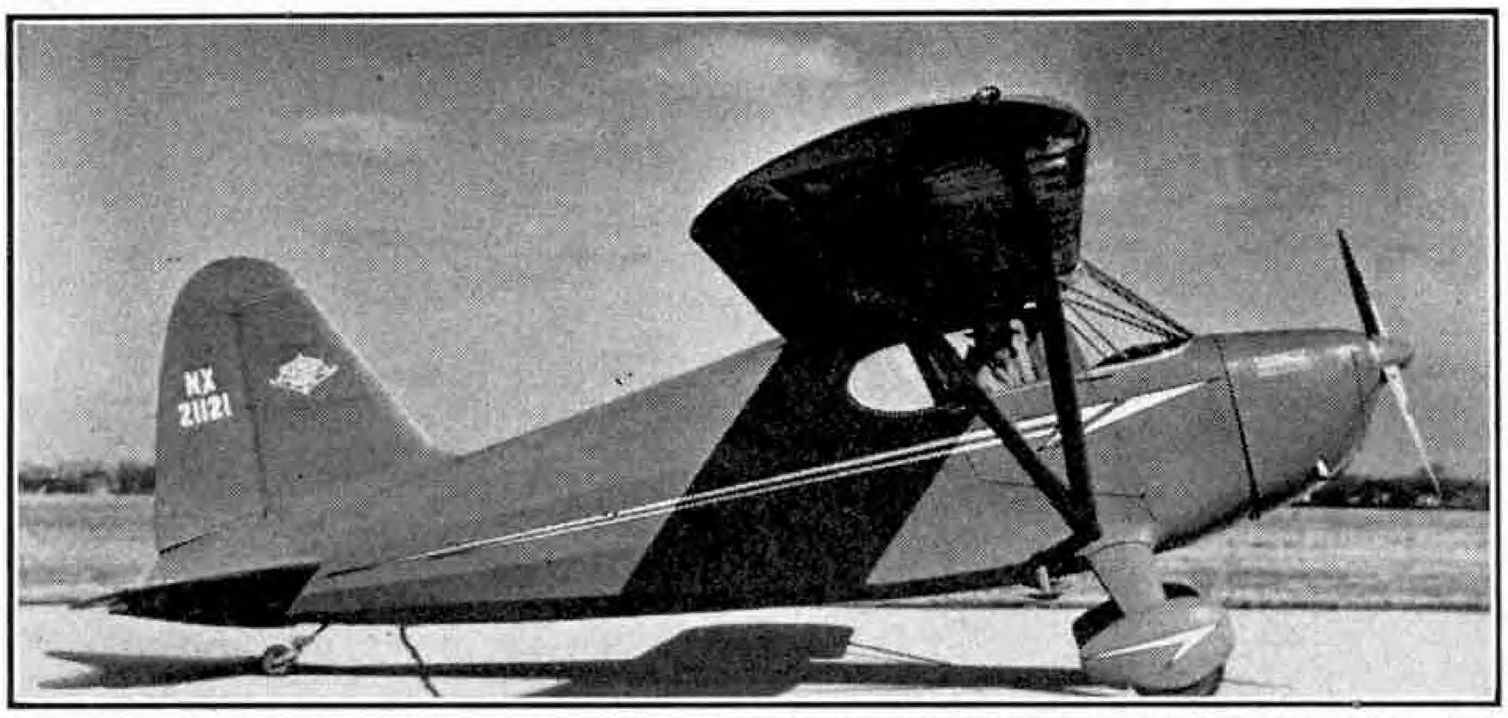
Pan American Airways have ordered six more 41-ton Boeing 314 "Clippers." They will be similar to the six Boeing flying boats delivered this year, four of which are operating across the Atlantic and two across the Pacific. The additional fleet will enable Pan American Airways to increase their transatlantic service from two to four round trips a week. It will make possible also the use of all-Boeing equipment on the present trans-Pacific service to China, and on a proposed weekly service to New Zealand. Other aircraft would be used on the South American routes, on which flights are shorter.

High Flying Across the South Atlantic

A flight across the South Atlantic, which is claimed to be the first ever made over that ocean at a height of more than 20,000 ft., has been accomplished by a Farman aircraft. This was flown from France to Rio de Janeiro, with halts at Dakar, in French West Africa, and Natal, in Brazil, and the ocean crossing took 12 hrs. The greatest height reached was 29,500 ft., and the average height for the flight was 24,600 ft. The aircraft had a specially equipped cabin and oxygen-breathing apparatus, and carried a crew of four, consisting of two pilots, radio operator, and mechanic.

* * * *

The Maharajah of Jaipur, India, has ordered a Lockheed "Electra" monoplane. The Maharajahs of Jodhpur and Kashmir also have Lockheed machines.



The Stinson "105" 3-seater cabin monoplane. It has special wing slots built into the leading edges of the wings. Photograph reproduced by courtesy of the Stinson Aircraft Division, U.S.A.

Light Aeroplanes Boom in Eight Months

The great demand in the United States for light civil type aeroplanes continues, and during the first eight months of this year the Piper Aircraft Corporation of that country produced 1,000 "Cub" light aircraft, some of which have been trainers, and others of the sports and coupé type.

Seven "Cub" Coupés have been bought by the United States Civil Aeronautics Authority. Five of the machines are to be used by representatives of the Private Flying Division of the Authority for getting about the country to promote private flying.

More Aircraft for Royal Dutch Airlines

The large fleet of aircraft maintained by Royal Dutch Airlines consists entirely of Douglas types, and 20 of the machines are Douglas DC-3s. The Netherlands Government have agreed to advance the company the sum of £400,000 for the purchase of additional aircraft.

It is reported that the company have now become interested in Fokker aircraft, and that the Fokker Company have designed for them a 5-engined air transport aeroplane equipped for day and night flying.

Royal Dutch Airlines reached their 20th anniversary on 7th October last. In normal times they operate a thrice-weekly service between Amsterdam and the Dutch East Indies. The full trip takes 5½ days in summer and a day longer in winter.

Russian Airmen make New Speed Record

An international speed record of 251.615 m.p.h. has been achieved by two Soviet air pilots Shabanov and Matveyer, flying non-stop over a closed triangular course totalling 3,149 miles, and beginning and ending at Moscow. They used a Stal-7 air liner, fitted with two 960 h.p. engines, and were accompanied by a radio operator named Baikuzov, but did not carry any passengers or freight. The previous record in this class was 249.051 m.p.h., set up on 8th June 1938 by the well-known French airman Rossi, with an Amiot 370 twin-engined aeroplane.

New York's Latest Airport

A fine new airport for New York City was opened by Mayor La Guardia on the 15th October last. It is at North Beach, Long Island, and in part is laid out on land reclaimed from the adjoining East River and Flushing Bay. The longest of the runways extends for 6,000 ft. and is 200 ft. wide, and the shortest is 3,532 ft. long and 150 ft. wide. The airport has six large hangars, fitted with electrically-operated steel and glass doors that are raised in sections and swung inward when entrance or exit is desired. The three-storey main building contains passenger booking and freight facilities, pilots' quarters, a post office and a restaurant, and on the top floor is the traffic control and weather bureau.

A flying boat base at the western end of the airport has its own administration building and hangar. There is special equipment for hauling seaplanes out of the water and up a ramp to the hangar.

Washington also is to have a large new airport, and this is being constructed mainly on land reclaimed from the Potomac River at Gravelly Point. It will be 742 acres in extent, almost two-thirds of which will form the landing ground. The two main runways will be 6,875 ft. and 5,300 ft. long respectively and 220 ft. wide.

"Air Uncles" in Sweden

In most countries there are many young men eager to learn to fly but who cannot afford the cost of tuition. The Aero Club of Sweden has introduced a novel scheme to help such enthusiasts, in which every person who undertakes to pay for the training of a prospective young airman is given the title of "Air Uncle" or "Air Aunt." The idea has proved attractive to the public, and although in Sweden the cost of training a young man for his "A" licence is about £70, over 100 offers of this sum have been made to the Club.

Civil Aviation in New Zealand

The annual Report on Civil Aviation in New Zealand was published recently. It covers the year ended 31st March last, and shows that both commercial and private flying in New Zealand continue to increase. A total of 1,574,395 miles were flown by scheduled aircraft, as compared with 1,331,100 miles during the previous year, and 53,039 passengers were carried, an increase of nearly 10,000. Freight transported by air totalled 166,278 lb., or just over double the previous annual figure. The number of aircraft registered in New Zealand on 31st March last was 107, three of which were four-engined machines, 15 twin-engined, and the remainder light, single-engined aircraft.

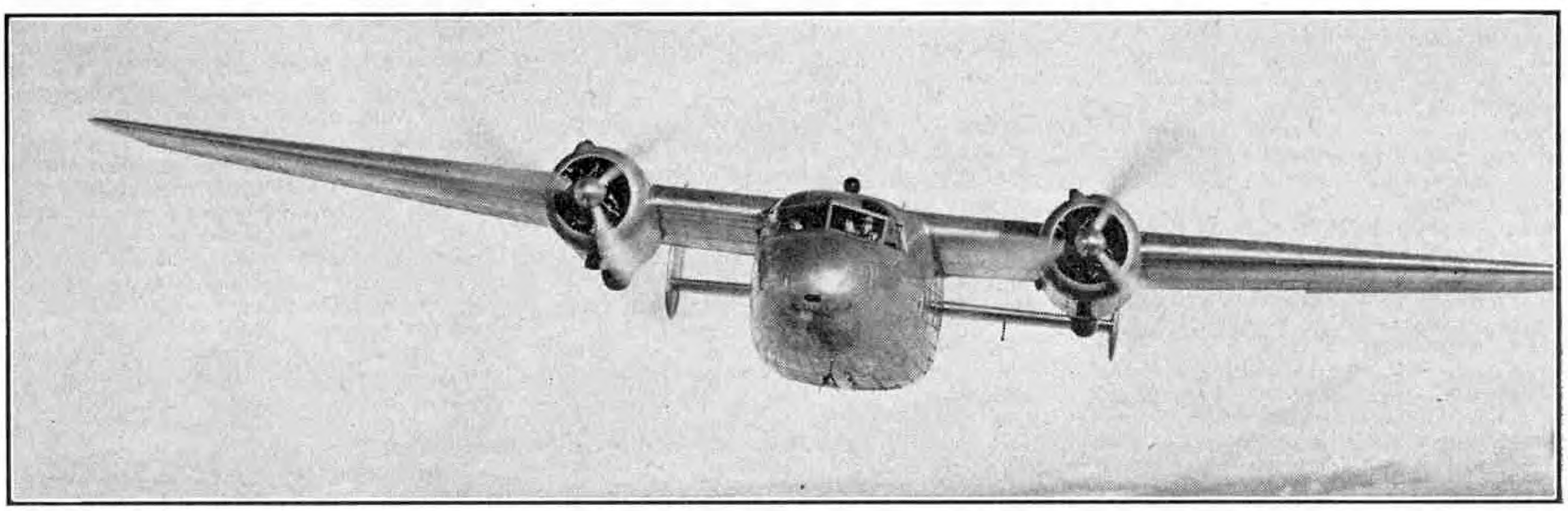
On the date mentioned there were 55 licensed aerodromes in New Zealand, at 15 of which radio stations were in operation. Aero clubs in the country totalled 14, and the total of 3,690 members included 554 who held "A" or "B" licenses.

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An American firm have produced a new fabric that is claimed to be much better than silk for making parachutes.

* * * *

The first Lithuanian air service was inaugurated recently. It operates between Kaunas, the capital of that country, and Riga, in Latvia. At present three trips every week are being made.



This unusual "head-on" view of a D.H. "Flamingo" air liner in the air shows that the pilot has a very wide, clear view from his cabin. Photograph reproduced by courtesy of de Havilland Aircraft Co. Ltd.



BOOKS to READ

Here we review books of interest and of use to readers of the "M.M." We can supply copies of these books to readers who cannot obtain them through the usual channels. Order from Book Dept., Meccano Limited, Binns Road, Liverpool 13, adding 1/– for postage to the price. Postage on different books varies, but any balance remaining will be refunded.

"Polar Exploration"

By ANDREW CROFT. (A. and C. Black. 7/6 net)

All boys are eager to read of the adventures by sea, on land and in the air by which the Arctic and Antarctic have been explored, and they cannot do better than turn to this splendid book. The author has been a member of two important expeditions that wintered in the Arctic, and has worked among both Eskimos and Laps. He is therefore an authority on his subject.

The book is divided into two sections, dealing with the Arctic and the Antarctic regions respectively. In the first we trace the pioneer journeys of Franklin, Ross, Nansen and others, and the conquest of the North Pole by Peary. Then we read of incredible hardships endured in the inhospitable regions of northern Greenland by Danish explorers, and of the wonderful expeditions in Arctic Canada of Stefannson, who lived on the animal life of the Arctic itself. Next we come to the exploration of unknown parts of Greenland and Spitzbergen in recent years by youthful explorers, whose travels have been rich in scientific results. Finally we have stirring accounts of Arctic flights, from Andrée's ill-fated effort to reach the North Pole by balloon to those in which Russian airmen set up world records by flying from Moscow to the United States over the top of the world.

When we turn to the Antarctic we find that there is an equally absorbing story to tell, although efforts to penetrate into the icy regions round the South Pole began much later than exploration in the North. The expeditions led by Scott and Shackleton, both of which were productive of heroic effort, are well described, as is Amundsen's famous dog team dash southward that gave him the honour of being the first to reach the South Pole. Mawson's stay in Adélie Land and his subsequent explorations are fully dealt with, and we are told how Byrd flew over the South Pole and discovered great ranges of mountains from the air, and of the most recent expeditions, notably the British one under Rymill.

The book has eight excellently-chosen illustrations and eight maps.



Greenland boats. From "Polar Exploration," reviewed on this page.

"Wings in the Sun"

By L. HUGH NEWMAN
(E. J. Arnold and Son Ltd. 1/– post free)

This is a delightful little book on butterflies. Mr. Newman has complete mastery of his subject, as readers of his fine articles in the "*M.M.*" well know, and it is delightful to read these stories, in which he explains where butterflies come from and how they live, and tells us how to hatch them out and keep them as pets in the garden or indoors. Many readers will be surprised to learn also that butterflies are great travellers, and there are countless other interesting revelations in Mr. Newman's book, such as the success with which butterflies hide themselves, owing to their remarkable protective colouring and the strange places in which some of them pass the winter.

Mr. Newman also tells us about very rare butterflies and encourages us to keep a look out for them, finally explaining how to take up such hobbies as drawing and painting butterflies and photographing them.

There are many excellent photographs of butterflies in the book, which will be thoroughly enjoyed by all boys—and girls—who are interested in nature study.

"Young Chemists and Great Discoveries"

By JAMES KENDALL, D.Sc., F.R.S. (Bell. 7/6 net)

This is a book in which "*M.M.*" readers will revel. To begin with it is the reproduction in book form of one of the fascinating series of lectures given at Christmas at the Royal Institution, lectures that are profoundly interesting and are illustrated by experiments of an exciting and spectacular kind. In the second place the author announces what seems to be a remarkable discovery—that it is young men who have been responsible for most of the great discoveries. His accounts of the early struggles of many of his heroes; and the astonishing results of their experiments, in some cases carried out with home-made apparatus, show that he is right. His stories are brilliantly told. They hold our interest, and after reading them we have a true picture of his heroes.

The first of Professor Kendall's young chemists provides an outstanding illustration of the brilliance and originality of youth. He is Humphry Davy, who was so young when he became professor of chemistry at the Royal Institution in 1801 that he was not allowed to use the main lecture room. Davy was a splendid and original experimenter, and was only 28 years of age when he proved himself "the first chemist of his time." It has been said that his greatest discovery was Michael Faraday, the next "young chemist" of this book. Faraday was only 40 when he discovered the principle of the dynamo, and by that time he had already made a great reputation as a chemist.

After this splendid start we plunge into chapters dealing with great figures such as Pasteur; Moseley, the famous English physicist who was only 26 years old when he was killed in action in the Dardenelles; the Curies, who discovered radium, and youthful American geniuses such as Hall, who showed us how to manufacture aluminium, and Langmuir, the man who halved the world's electric light bill by introducing the gas-filled lamp. Another famous chemist whose story we are told is Perkin, the young Englishman who was only 23 years of age when he made the first coal-tar dye, and so founded one of the greatest of our modern industries.

Every page of the book is packed full of interest for all readers, whether they are students of chemistry or not, and its attractions are increased by the many splendid illustrations it contains.

"Scale Railway Modelling To-day"

By Edward Beal. (A. and C. Black. 7/6 net)

The author is well known as an authority on small-scale miniature railway practice, and his latest work is a review of the craft as it is to-day. It is no mere catalogue, however. It covers practically the whole field of small-scale railway modelling in an attractive and readable manner, and can be described as an effort to bring the very latest developments to the notice of miniature railway enthusiasts.

The book begins with a general survey of model railways in Great Britain and the United States, and then passes to a description of the workshop equipment that is required by those who take their railway modelling seriously. Then we have chapters dealing, first in a general way and then in detail, with layout schemes for the passenger, freight and locomotive departments of a system. Sandwiched in between this section and one covering extensible layouts and an attractive dockside terminal plan is a useful chapter on the construction of the baseboard needed for a permanent line.

The track itself in its various forms is next considered, and then come schemes for building high-level and depressed tracks, tunnels, bridges, viaducts and buildings of various kinds. Here Mr. Beal excels, displaying complete knowledge not only of the principles of the art but also of the practical details. Motive power next claims attention, and those who go in for the building of their own locomotives will find much to interest them. A special chapter is devoted to Hornby-Dublo locomotives. Mr. Beal has slipped in describing the 0–6–0 Tank Engines of the Series as finished in black for all groups—the S.R. and G.W.R. models are in green—but otherwise he has done full justice to the Hornby-Dublo locomotives.

Freight stock in immense variety, breakdown stock, miniature coach-building and coupling equipment are then dealt with, and then follow useful chapters on painting and lettering, power supply for electric railways, points and signal operation, both mechanical and electrical. The book concludes with a chapter on scenery, population and road traffic.

There are some 350 illustrations in line and half-tone.

"Gay Company"

By Catherine Scales
(The Children's Book Club. 2/6)

Younger readers of the *"M.M."* will enjoy these gay and amusing stories. Some of them concern George, a black cat who started life down a rabbit hole. George is adventurous in spirit, and on a journey down a long, white road he meets with the strangest and most whimsical adventures. Then we have the adventures of Mr. Nugger, a foolish dachshund, and other stories that are full of fun and absurdities. The many illustrations are in keeping with the stories.

"Storms on the Labrador"

By Hepburn Dinwoodie. (Harrap. 5/– net)

This is a fine tale of adventure, hardship and excitement in Labrador. The central figure is Steve McCoy, the boss of a lumber mill in the winter and of a fishing station in the summer, and there is also Finley Holloway, a boy of 13 years of age who in his company learns to fish and sail and swim. We follow these and other figures in their adventures in the rugged northern country, first in the lumber mill, and then out at the fishing stations.

The climax of the story comes when Finley with two companions is marooned on an island in a violent storm. He and his companions nearly perish in the snow, but are rescued by Steve after a perilous and exhausting journey across raging waters in which he was in imminent danger of destruction. With all this excitement there is real fun in the interchanges between the various characters of the story, and running through the book is the story of Cracky, a small and intelligent Indian dog.

Older readers in particular will be thrilled by this very fine yarn.



The East Greenland coast from the ice-cap. From "Polar Exploration," reviewed on the opposite page.

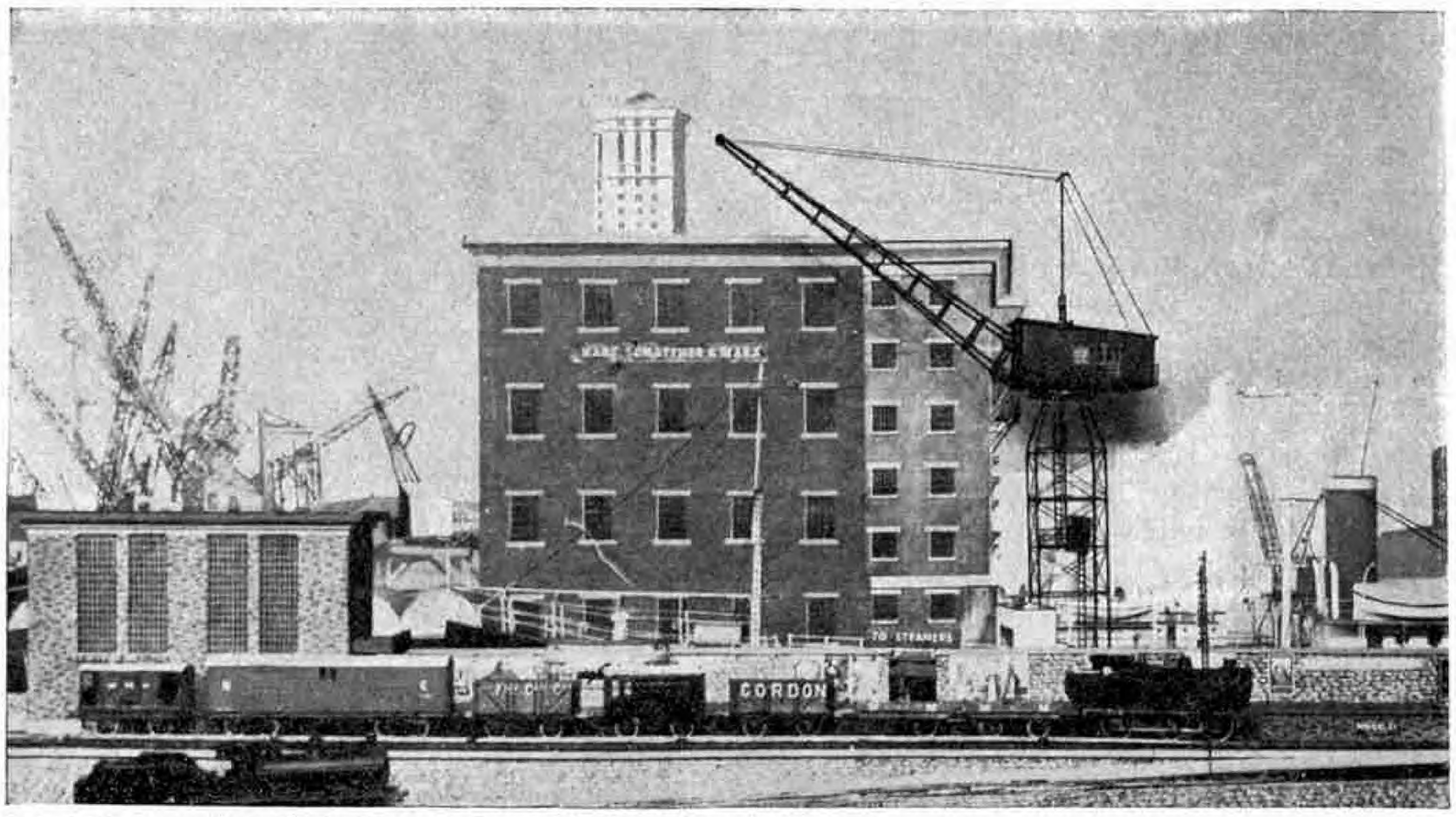
"Hello, the Boat"

By Phyllis Crawford. (Harrap. 6/– net)

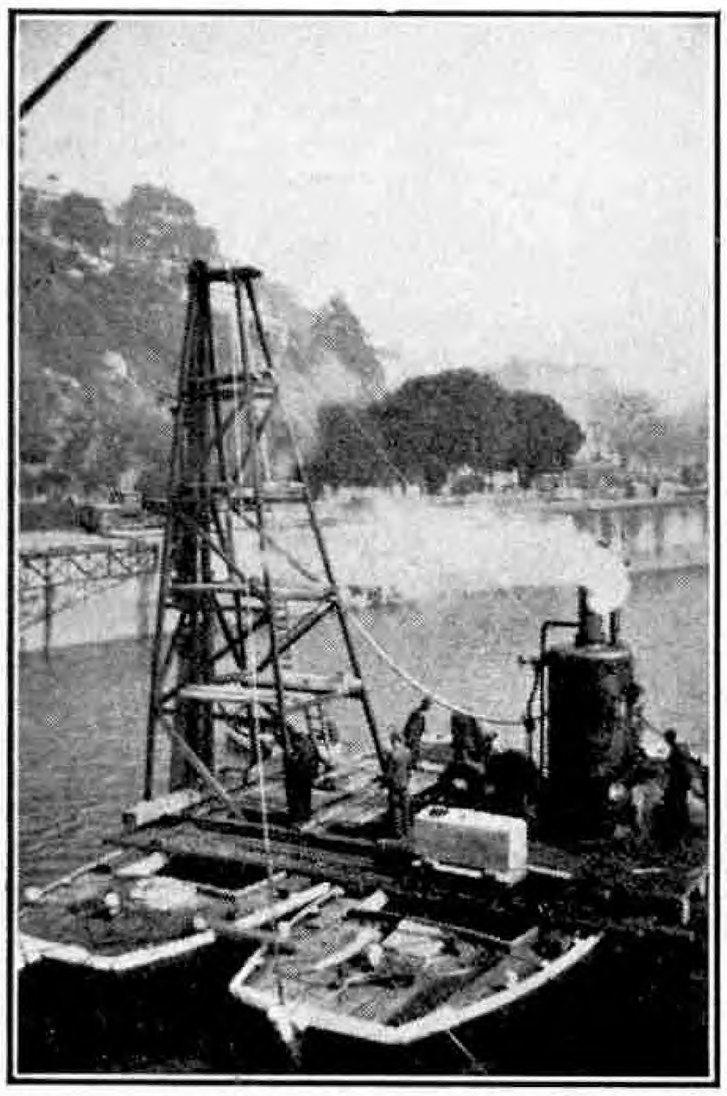
Many stories have been written of the great movement westward of the pioneers who explored and developed the United States. Here is one that deals with a part of this movement with which English readers are not so familiar. It describes a voyage down the Ohio River about 120 years ago in a boat that carried hardware, clothing and other goods for sale. Settlers along the banks of the river stopped the floating store by the call of "Hello, the boat" and boarded it to make their purchases in its cabin, or to exchange their own produce for anything useful the storekeeper had to offer.

There are no heroics in the story, which is that of the Doaks, the everyday family who lived in the store boat. It tells how the people of those days worked and played, and with the exaggerated yarns and stirring little episodes of frontier days it contains it makes up a simple yet absorbing story. Many readers of the *"M.M."* will find its chief interest in its foreshadowing of the coming of the steamboat on American waterways. The date of the story is 1817, when steam vessels were still strange threatening things in which rivermen had no faith, and we are introduced to one of the pioneers, who had brought his steamboat after a dangerous voyage into Cincinatti, the town where the voyage of the trading boat ends. The Doaks were keen steamboat enthusiasts, and were delighted when the head of the family was offered the managership of a new factory established in Cincinnati for the purpose of making steamship engines and other machinery.

The illustrations to the book are noteworthy. They are fine drawings by a well-known painter of American scenes, and are both lively in themselves and accurate pictures of scenes on the Ohio River more than 100 years ago.



Industrial scenery from the background of a model railway formed with posters and paper strip by the author of "Scale Railway Modelling To-day," reviewed on this page.



Pile-driving from barges lashed together. Photograph by G. P. Crabb, Torquay.

The Art of Pile-driving

Last summer I had the opportunity of seeing the pile-driver shown in action in the accompanying photograph, and gleaned a good deal of interesting information by watching it. Two barges were securely lashed together and on thick boards laid across them were a donkey engine, boiler and a structure resembling pit head gear. There were concrete weights on each side of the boiler to maintain stability.

The first part of the operation consisted in placing the pile itself in position. This was made of wood and had a steel point, and it was swung out from shore by a large crane that is not seen on the photograph. A rope from the donkey engine to the pile-driving plant was secured to the pile to enable it to be lowered into position. Then the rope was attached to the pile-driver, which was lowered on top of the pile, and steam under pressure was supplied from the boiler through the pipe seen in the illustration. The pile-driver commenced to hammer the pile unmercifully until it was driven down to the required depth.

While this work was in progress the barges carrying the equipment were securely anchored alongside the pile, and manœuvring them into place was a task that called for great skill. Instruments were employed when the position of the pile was being fixed.

G. P. Crabb (Torquay).

"From Our Readers"

These pages are reserved for articles from our readers. Contributions not exceeding 500 words in length are invited on any subject of which the writer has special knowledge or experience. These should be written neatly on one side of the paper only, and should be accompanied if possible by original photographs for use as illustrations. Articles published will be paid for. Statements in articles submitted are accepted as being sent in good faith, but the Editor takes no responsibility for their accuracy.

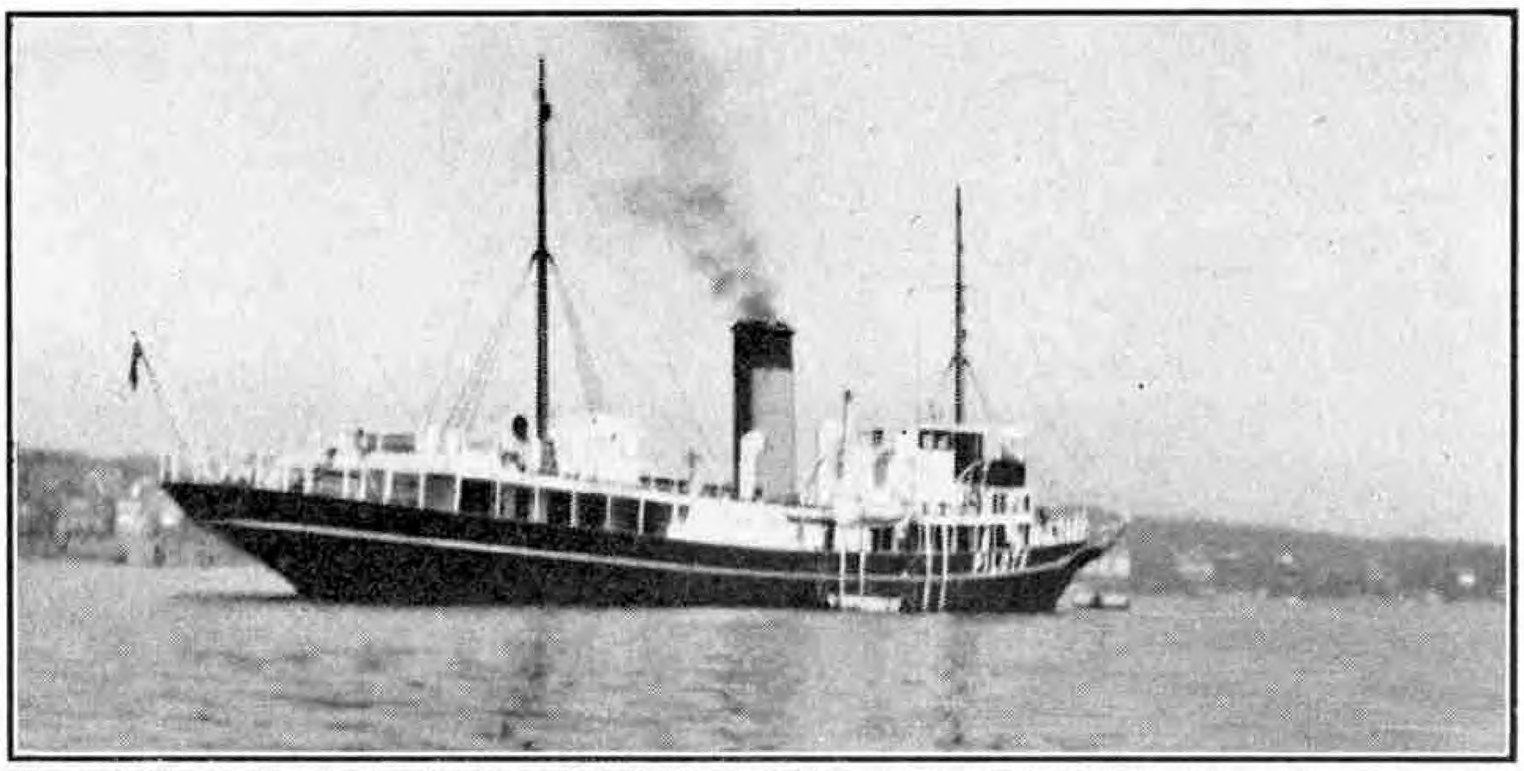
Sydney's New Pilot Steamer

The graceful vessel shown in one of the illustrations on this page is the new Sydney Harbour pilot steamer *"Captain Cook,"* which was built in Sydney and launched in December of last year. In her trials *"Captain Cook"* accomplished a speed of 12½ knots over the measured mile, and on their completion she was officially handed over to the authorities who control the Port of Sydney. She is stationed permanently at Watson's Bay, Port Jackson.

The new pilot vessel is 165 ft. long at the waterline and her registered tonnage is 524. She has excellent accommodation for a crew of 18 men and 12 pilots, and is well equipped throughout. A loud-speaking telephone service is fitted and the radio installation is of high standard. The foremost of the two pole masts carries a signalling yard and an electric signalling lamp, which is operated from the wheelhouse by means of a Morse key. On the bridge there are two 1,000w. marine searchlights.

The clipper bow is adorned by a bronze figurehead of Captain Cook, after whom the vessel was named. The great explorer is shown with his telescope tucked under his left arm while he gazes seaward, shading his eyes with his right hand. This figurehead was fitted on the pilot boat's predecessor. The present vessel is the third pilot steamer bearing the name *"Captain Cook."* The first was commissioned in 1877 and is still in service at Brisbane, Queensland. The second was built in Sydney and placed in service in 1893, when she was reputed to be the most up-to-date pilot steamer in the World.

K. N. Allen (Oatley, Australia).



The new Sydney pilot steamer "Captain Cook." This vessel has accommodation for 12 pilots, with a crew of 18. Photograph by K. N. Allen, Oatley, Australia.

Birds of the Farne Islands

One fine morning early this summer we crossed from the Northumberland coast to the Farne Islands. Our first stop was in a small cove lying between two of the islands. There the cliffs are low and access is not unduly difficult. As we approached hundreds of puffins could be seen on the cliffs, and the Pinnacles, two rocks rising sheer out of the sea, were seen to be literally covered with guillemots.

In spring and summer bird watchers live on the Island, and one of these men came over to meet us. He pointed out a small colony of roseate terns and showed us the nest of an eider duck. Kittiwakes were nesting in large numbers, and here and there a shag provided a contrast to the whiteness of the gulls.

We then crossed a sound to another island, passing close to a cormorant colony on the way. On landing we were welcomed noisily by

Arctic terns, which nest on the beach there in large numbers. The air seemed full of their graceful forms, with their red legs and beaks and their black caps setting off their snowy plumage wonderfully. A solitary pair of ringed plover were nesting among them. From time to time terns could be seen taking over incubation duties or bringing tasty morsels for the sitting birds. The eider duck too were very numerous and it was almost possible to stroke them as they sat on their nests. On the higher west side of this island we saw the uncommon Fulmar petrel.

The sky then began to take on a threatening aspect and we had to leave hurriedly. We reached the coast again after a choppy crossing.

P. MILLS (Compton, Greenfield).

A Holiday in the States

I spent my holiday last summer in the United States, making the crossing in the "*Queen Mary*." I shall never forget my first glimpse of the magnificent skyline of New York as we steamed slowly up the Harbour and the Hudson River to the Cunard White Star berth.

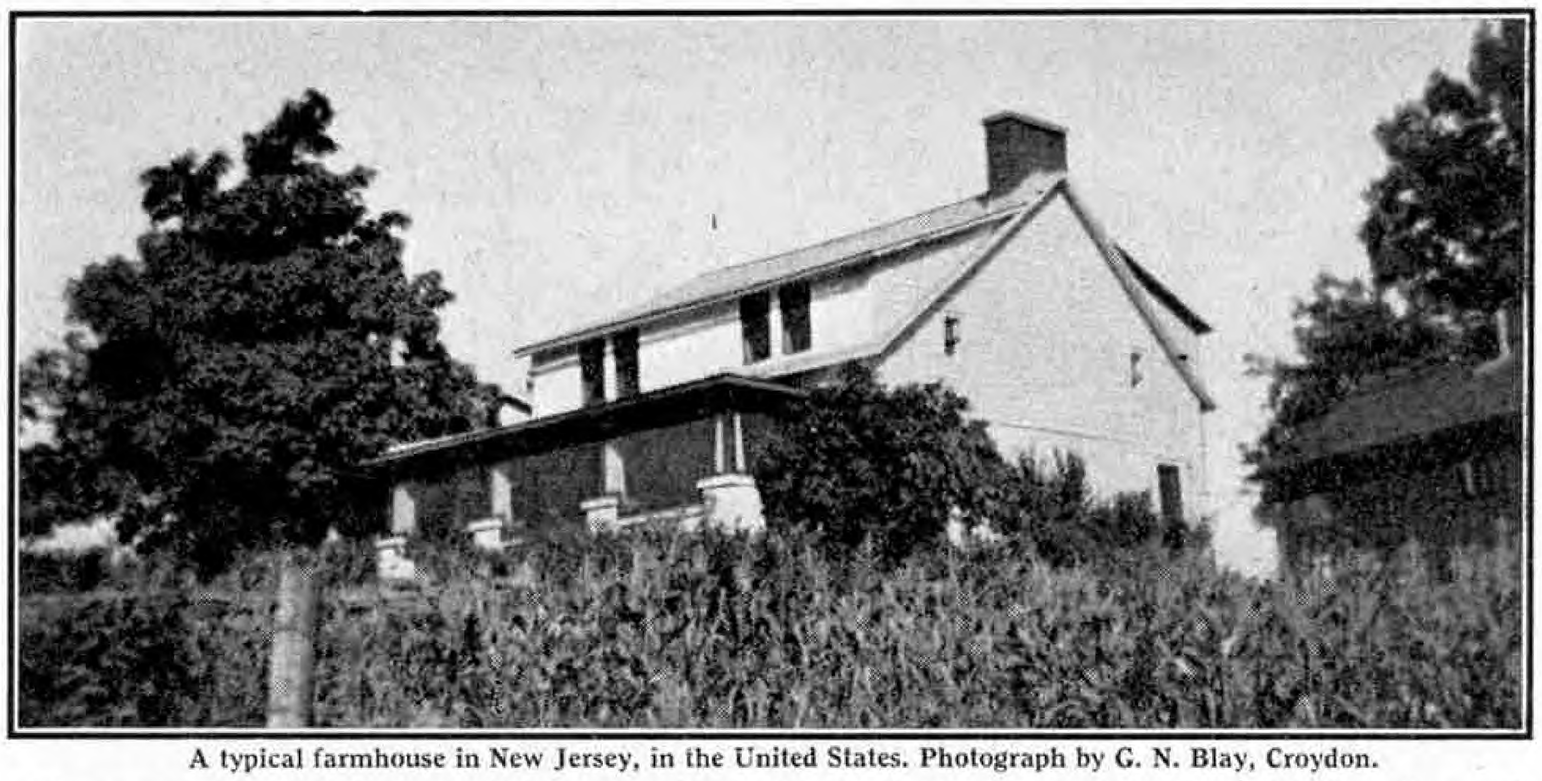


An eider duck on its nest built in the angle of a wall on one of the Farne Islands. Photograph by P. Mills, Compton, Greenfield.

I only had a few days in New York itself. One of the first things I did was to ascend the Empire State Building. This immense structure rises to a height of 1,250 ft. and covers an area of about two acres. In it there are seven miles of lift shafts, and the express lifts take one up at the rate of 1,000 ft. a minute. Visitors who like high figures are thrilled to learn that the building has 6,400 windows, and that 10 million bricks and 200,000 cu. ft. of stone were used in its construction. The view from the 102nd floor, high above the city, is magnificent.

The streets of New York look quite gay with streams of bright yellow and orange cabs mingling with the rest of the traffic. Transport is cheap, and for a nickel, or about 2½d., one can travel as far as one wishes by elevated railway, street car, subway or bus.

The greater part of my holiday



A typical farmhouse in New Jersey, in the United States. Photograph by G. N. Blay, Croydon.

I spent on a farm in Sussex, New Jersey, near the Kittatinny or Blue Mountains. There are many fine lakes around this district, and the countryside is heavily wooded. My host kindly took me about in his car, and I was able to visit many places of interest, among them High Point, which is the highest spot in the State, and Lake Mohawk, the largest private sheet of water in New Jersey. Hundreds of cottages surround the lake, which is the centre of what is considered the finest holiday playground in the Eastern States.

Wherever I went in the States I met with nothing but kindness, and was very sorry when my holiday came to an end. As a final thrill I returned in the new "*Mauretania*."

G. N. BLAY (Croydon).

A Railway Fair in Holland

I was greatly interested in the articles on the centenary of railways in Holland that appeared in the October "*M.M.*," as I visited the Railway Fair held in Amsterdam as a part of the celebrations. Among the many interesting exhibits were boats, sledges and sedan chairs, examples of means of transport used before the coming of railways. Most of the exhibits concerned the iron road itself, however. Various types of rail were to be seen, and models of engines and trains of various periods showed the wonderful and continuous development that has taken place in the 100 years from 1839 to 1939. In this development electric trains have been introduced, and exhibits that were always surrounded by interested visitors were the real cab fittings of the gigantic steam locomotive and those of a modern streamlined electric train.

Probably the greatest attraction of all was the replica of Holland's first train, drawn by a reconstruction of one of the two first locomotives, which ran round the grounds and provided trips for visitors, who thoroughly enjoyed their journeys in the primitive cars of the train. By way of contrast there was a reproduction of a modern station platform. On one side of this stood a streamlined electric train, and on the other was an up-to-date steam train, consisting of one of the largest engines of the Netherlands Railways and modern coaches of various types, including a new sleeping coach from France. Visitors passed through these trains, which looked really splendid both outside and inside.

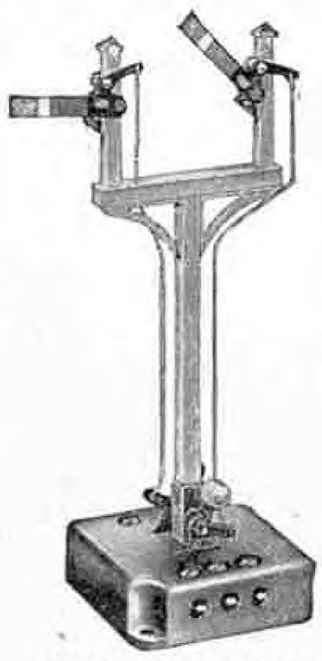
Interesting features of railway working were demonstrated for the benefit of visitors to the Fair. One of these showed why it is necessary to raise the outer rail on curves. Another consisted of a modern signal cabin, the levers of which moved real points and signals.

C. DONKER (Rotterdam).

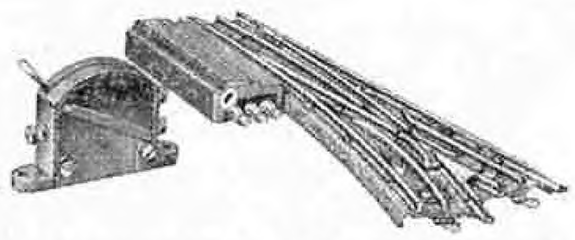
GAUGE '00'

HORNBY DUBLO

A C

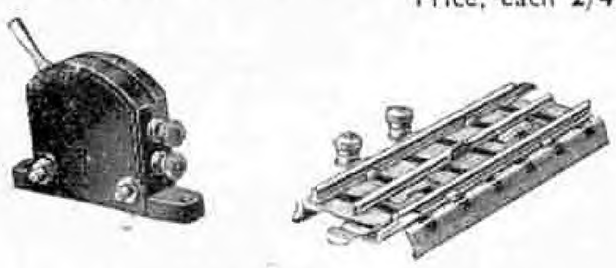


JUNCTION SIGNAL
Electrically Operated "Home" (as illustrated) or "Distant." Price **7/3**



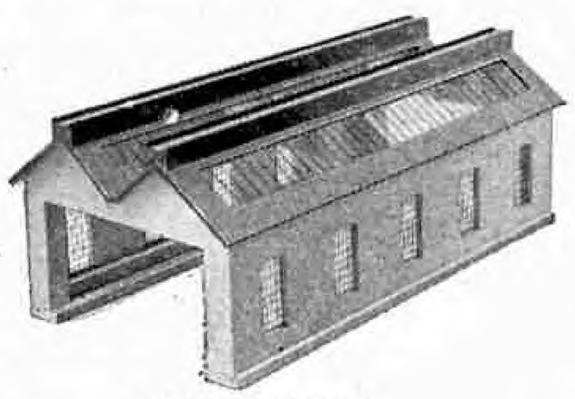
POINTS ELECTRICALLY OPERATED
Designed to work off a Dublo Transformer or D.C. Converter. The same Transformer or Converter that supplies current to the trains can be used.
Electrically Operated Points, Right-hand } pair
Electrically Operated Points, Left-hand } **17/-**

SWITCH D1
Specially designed to control the Hornby-Dublo Electrically Operated Signals and Points.
Price, each **2/4**



ISOLATING RAIL
The centre rail is divided into two separate sections, each connected to the terminal provided for wiring up to Switch D2.
Isolating Rails. Price, each **1/9**

SWITCH D2 (For Isolating Rail)
For connecting to the terminals of the Isolating Rail to make an isolated section of track "alive" or "dead" as required. Price, each **2/-**



ENGINE SHED
The Shed will accommodate two Hornby-Dublo express Locomotives and their Tenders.
Price **11/6**

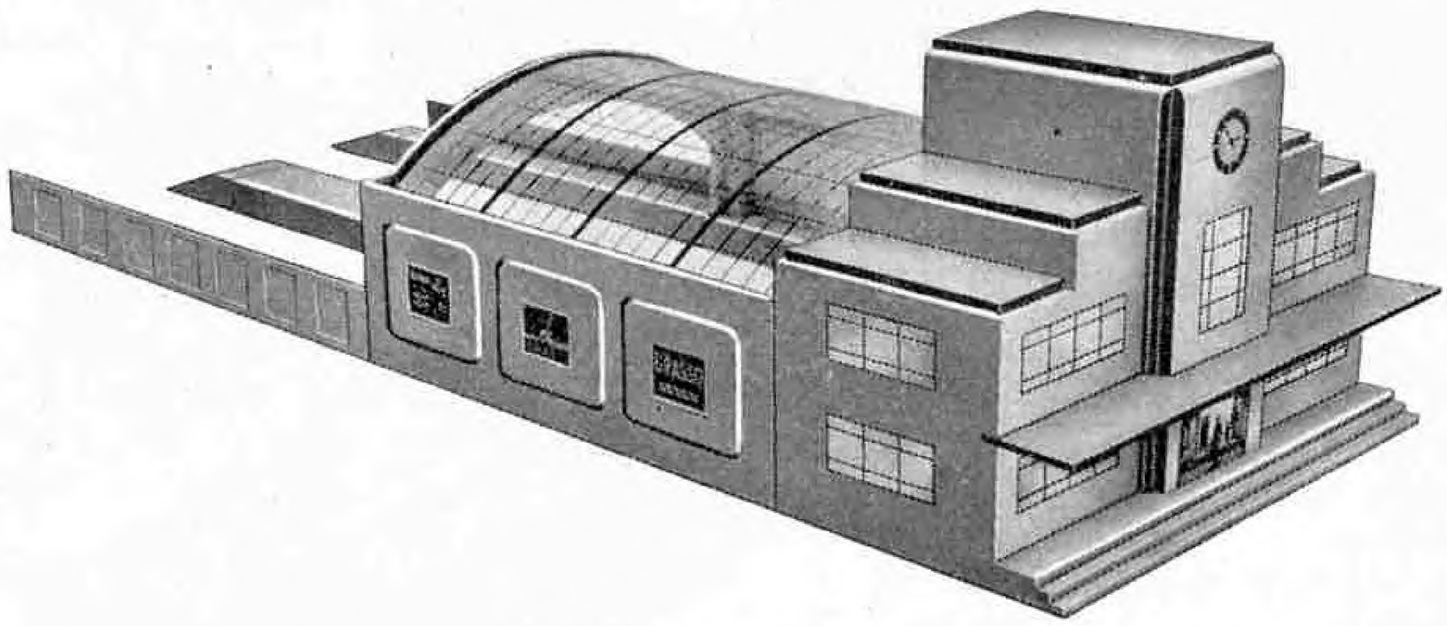
Thrilling new developments in this marvellous railway!

When the Hornby-Dublo System was introduced, we promised to develop it by the addition of Electrically Operated Points and Signals. These are now ready. **By means of a special Switch, Points and Signals can be controlled just as on real railways.** The two arms of the Double-arm and Junction Signals can be operated independently in the most realistic manner.

An even greater development is the introduction of Isolating Rails and Switches, by means of which different sections of track can be made "alive" or "dead" as required. With these Rails and Switches endless fun can be had by controlling two or more trains independently at the same time. **All kinds of fascinating shunting operations can be carried out, every movement being made as on an actual railway.**

The Hornby-Dublo track is now completed by the introduction of Large Radius Curved Rails which, used in conjunction with the standard Dublo rails, form **a perfect double track.**

Another new feature is the D.C. Converter. If your home has Direct Current **this Converter will enable you to run your Hornby-Dublo Trains from the mains just as easily, safely and successfully as with a Transformer from Alternating Current Mains.** The D.C. Converter provides sufficient current to run two trains at the same time, each on a separate track.



CITY STATION OUTFIT D2
This Outfit has been specially designed for building either of two splendid city stations.
The Terminal Station illustrated above is an imposing model in the modern style, with three platforms covered by an arched roof span in celluloid.
The Through Station seen in the railway on the right is an equally effective model, built up from the same components and ideal for through running on a large layout.
Price **28/6**

Dublo brightens blackout nights

A COMPLETE MODEL RAILWAY ON A DINING TABLE

PRICES OF HORNBY-DUBLO TRAIN SETS

Hornby-Dublo Electric Passenger Train Set (L.N.E.R.), mains operated ...	**77/6**
Hornby-Dublo Electric Passenger Train Set (L.N.E.R.), for use with 12 volt accumulator	**67/6**
Hornby-Dublo Clockwork Passenger Train Set (L.N.E.R.)	**43/6**
Hornby-Dublo Electric Tank Goods Train Set (L.M.S., L.N.E.R., G.W.R. or S.R.), mains operated	**62/6**
Hornby-Dublo Electric Tank Goods Train Set (L.M.S., L.N.E.R., G.W.R. or S.R.), for use with 12 volt accumulator	**52/6**
Hornby-Dublo Clockwork Tank Goods Train Set (L.M.S., L.N.E.R., G.W.R. or S.R.)	**30/–**



★ *You must have this free folder!*

An attractive new folder is now available giving complete particulars of the Hornby-Dublo Railway System. Get a copy from your dealer or write direct to

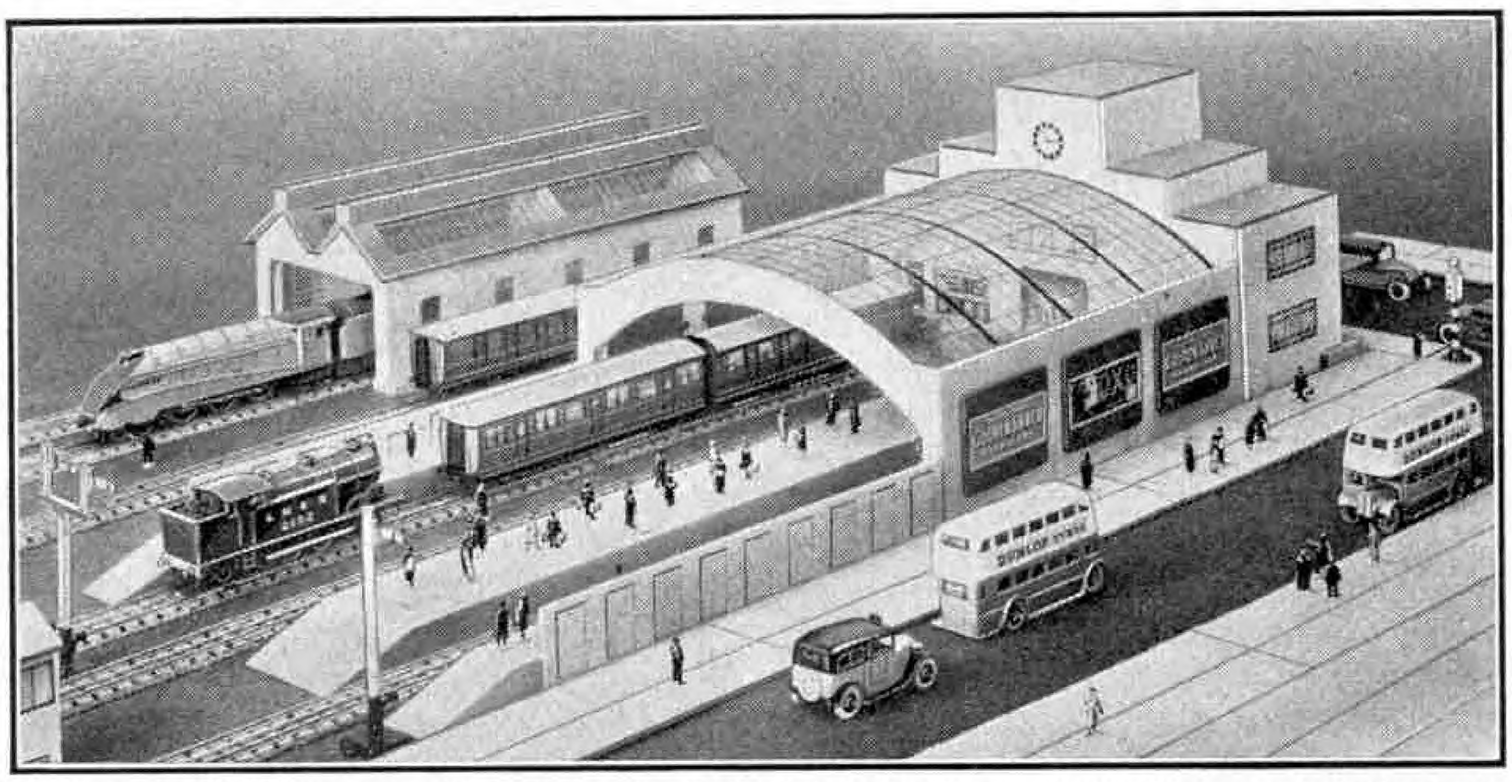
MECCANO LTD., DEPT. DF, BINNS RD., LIVERPOOL 13

Hornby-Dublo Developments

The Perfect Railway Becomes Super-Perfect

THIS month is a notable one to all Hornby-Dublo railway owners, for it marks the introduction of new features of remarkable interest that add enormously to the already great possibilities of this popular system.

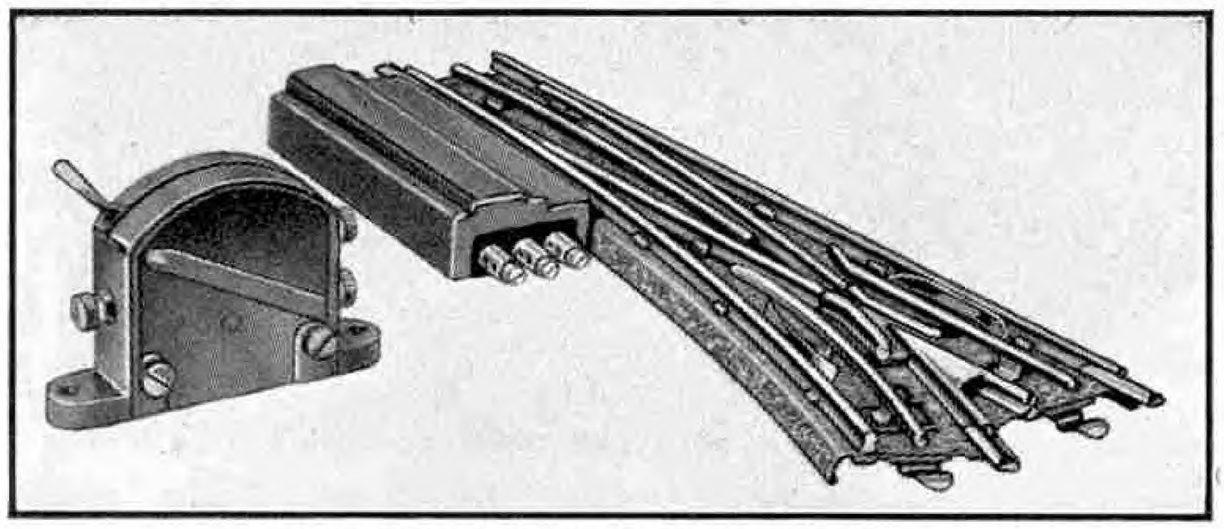
First of all there are the Isolating Rails and Switches, by means of which different sections of track can be made "alive" or "dead" as required. This means that endless fun can be had by controlling two or more trains independently at the same time. All kinds of fascinating shunting operations can be carried out, every movement being made as on real railways. The possibilities opened out by the Isolating Rails are tremendous. Even where there is only one Controller, one train can be run while others are standing at stations or in sidings. With two or more Controllers shunting can be done quite independently of movements carried out on the main line.



The "Terminal" Station constructed from the new City Station Outfit. The new Engine Shed is in the background.

The Isolating Rail consists of a short piece of track, the centre rail of which is divided into two sections by an insulating gap. Each section is wired to a terminal at the side of the track, and these terminals are connected to a special D2 Switch. If, for instance, the Isolating Rail is placed at the entrance end of a siding, this siding can be made either "alive" or "dead" at any moment. Thus a train can be run into the siding, and the siding section then switched out so that the train can be held there while operations are carried out on the main line or elsewhere. One Isolating Rail is sufficient to make a dead-end siding electrically separate from the main track; two Isolating Rails are required for a loop line, one at each end of the loop.

The special Switch D2 for controlling the sections separated by the Isolating Rail is a self-contained unit of the "on-off" type enclosed in a Bakelite case. There are terminals for wiring to the corresponding terminals of the Isolating Rail, and at the base of the Switch case are feet pierced with holes to take screws for fixing the Switch to a baseboard or control panel. The control lever is at the top of the Switch case.



A "D1" Switch and Electrically Operated Points.



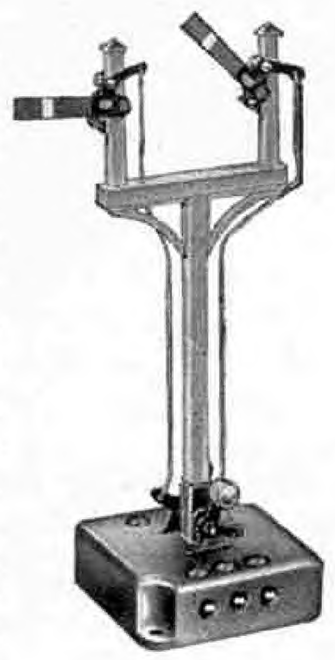
A "bank" of Switches secured by Grouping Rods.

With the Isolating Rails are packed full instructions for wiring and operation. In future articles we shall show how these Rails can be used to the best advantage in layouts of various types.

Next we come to the Electrically Operated Points and Signals. These accessories were promised when the Hornby-Dublo system was first introduced, and judging by the widespread demands that have been made for them they should prove one of the most popular features of the system. As to their fascination there is no possible doubt.

The Signals, which are of the latest upper quadrant type, are beautifully designed, and their electrical operation is perfect. The two arms of the Double Arm and Junction Signals can be controlled independently in the most realistic manner. The mechanism of the signals is contained inside the base, and is thus completely concealed.

The Electrically Operated Points are of the standard right-hand and left-hand type, the mechanism being accommodated inside a neat casing placed alongside the Points in a similar manner to the arrangement of points operating machines on real railways. These electrical Points work smoothly and with great certainty.

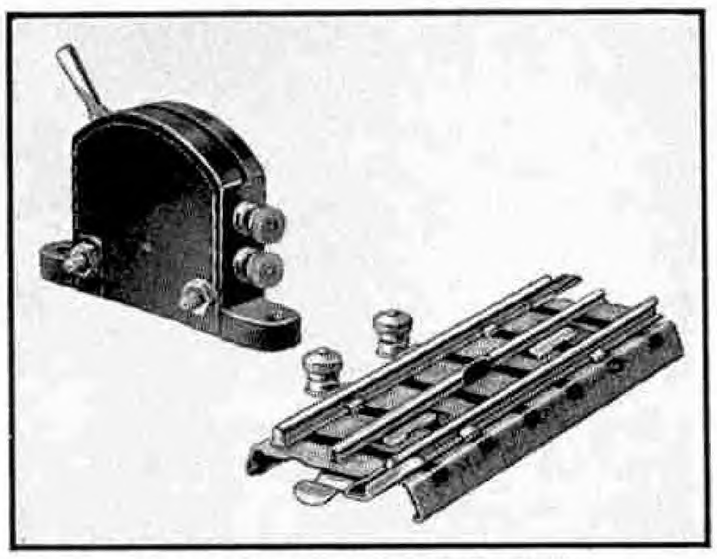


ED3
Electrically Operated Junction Signal.

Current for the Electrically Operated Points and Signals is obtained from the same Dublo Transformer or D.C. Converter that is used for supplying current to the track. Control is by means of a specially

designed Switch D1. It should be noted that two Switches are required for each Double Arm and Junction Signal. The maximum number of Points and Signals that can be controlled from one Switch is four, which is sufficient for all ordinary requirements. There is no limit to the number of Signals and Points that can be operated from a single Transformer or Converter, but not more than four of these accessories should be operated at the same time.

In most layouts the Electrically Operated accessories would be controlled by individual Switches, and the best results are obtained by grouping the Switches in "banks," thus producing a realistic switchboard. The grouping is carried out by means of Switch Grouping Rods, which are threaded through holes provided in the Bakelite cases of the Switches. The D1 and D2 Switches already referred to are similar in size and shape, and may be grouped together as illustrated on the previous page. They are easily distinguishable by the simple fact that the D1 Switch has a red case, and the D2 has a black case.

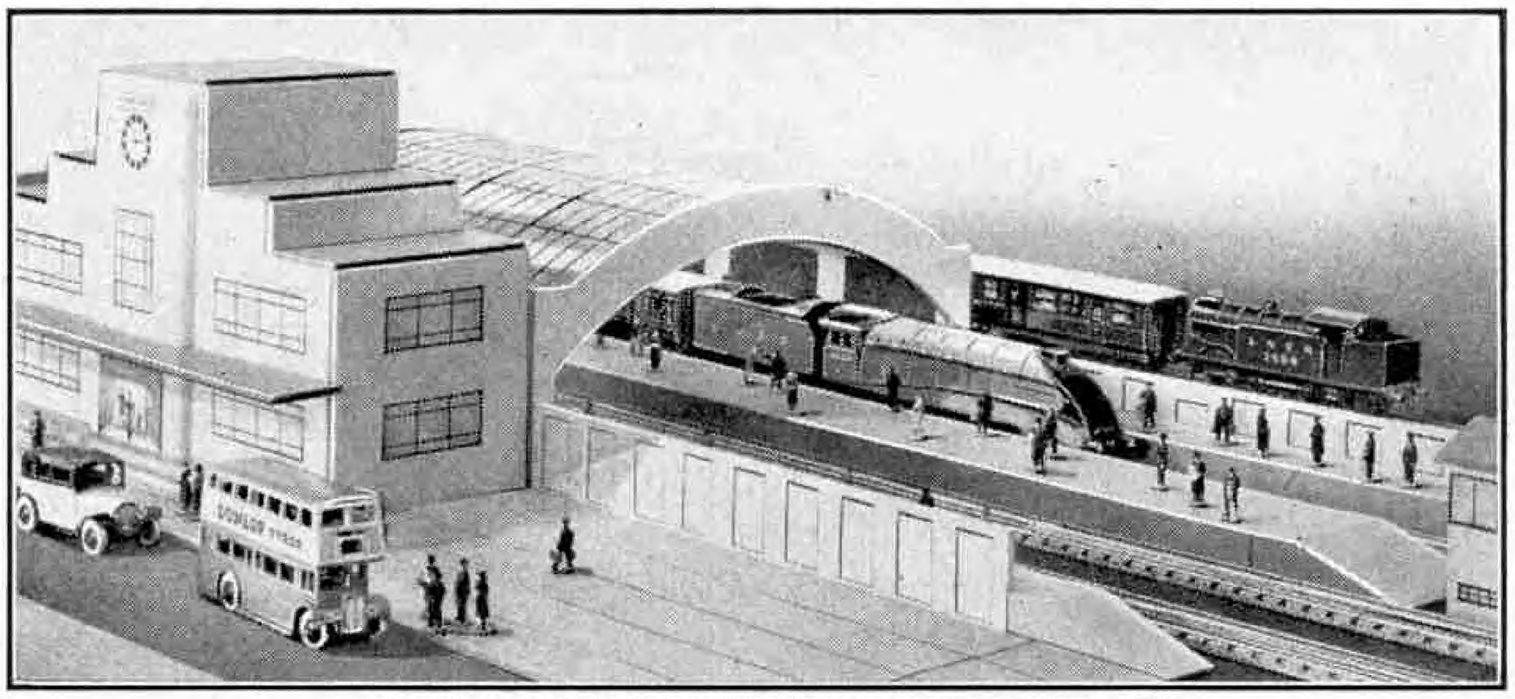


A "D2" Switch and Isolating Rail.

When several Switches are grouped together it is necessary to identify each one with some particular Points, Signal or Isolating Rail, and a white label for this purpose is included with each Switch. This label can be marked as required, and slipped over the Switch operating lever.

The Hornby-Dublo track is now completed by the introduction of Large Radius Curved Rails. These rails have a radius of 17½ in., and used in conjunction with the standard 15 in. radius curves provide a perfect double track. The increased possibilities provided by double track are surprisingly great, and must be experienced to be fully realised.

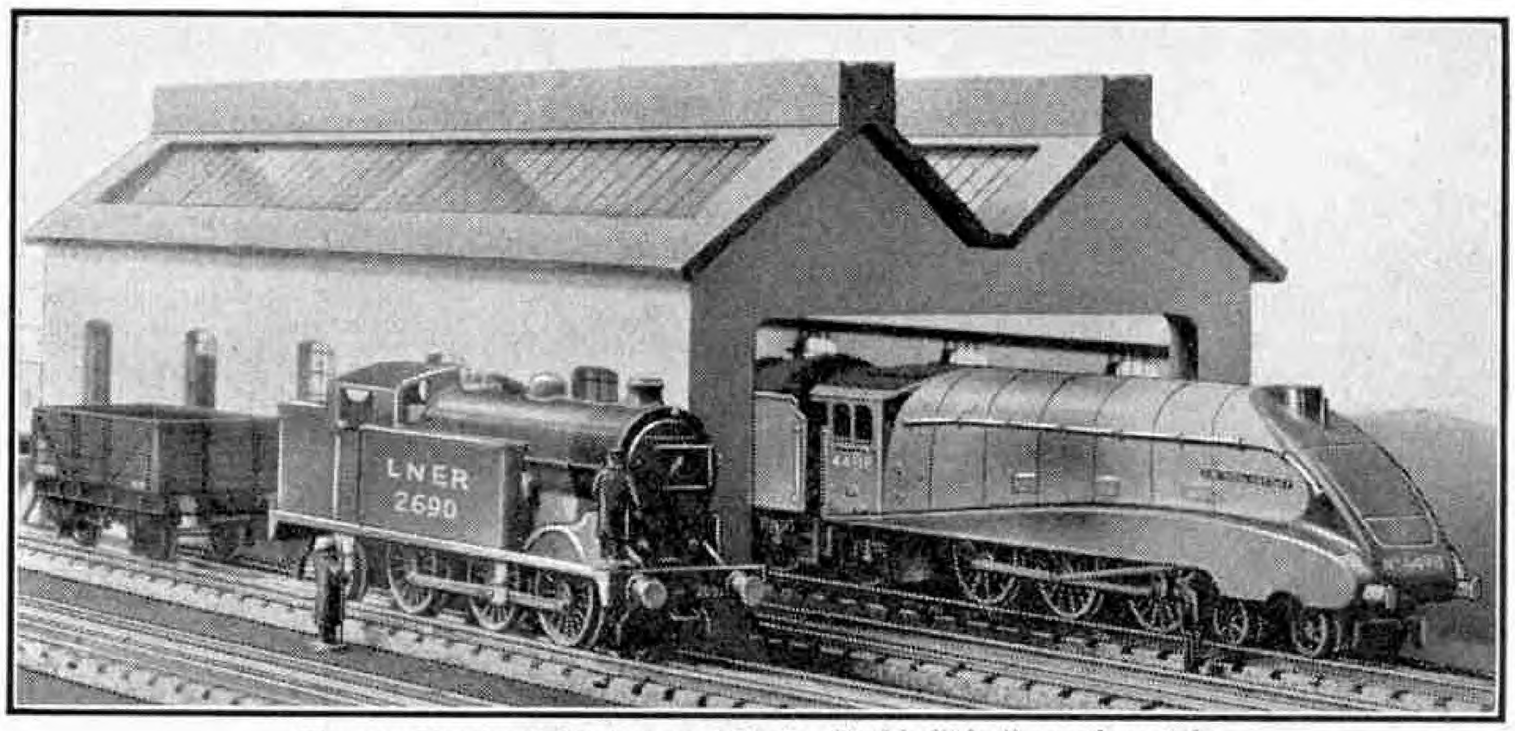
Stations play an important part in any layout, and they often make all the difference between a really striking railway and one which, though otherwise good, has a dull appearance. The Hornby-Dublo system already has attractive stations; to these are now added a City Station Outfit, specially designed for building either of two large and attractive station designs. One of these is a terminal station in the modern style, with three platforms covered by an arched roof span in celluloid. The front of the station, with its steps, awning and clock tower, is remarkably realistic. The other is a through station of a particularly useful and attractive type, which is ideal for through running on a large layout. As we all have our own ideas about stations, it is interesting to know that the component parts of this City Station Set are available separately, so that if desired quite extensive alterations can be made. For instance, the covered section of the station can be extended to cover a larger portion of the platform area, and the platforms themselves can be lengthened as desired without the slightest difficulty.



The "Through" Station constructed from the City Station Outfit.

Another accessory for which there has been a great demand is the Engine Shed. This is an attractive two-road building in modern style, with windows along each side and roof glazed with celluloid, and two bays each with smoke vent. The shed will take two Hornby-Dublo passenger engines and their tenders.

And now for wonderful news for readers who have Direct Mains Current in their homes, and who for so long have been thinking with envy of their fellow readers who have Alternating Current Mains, and have been able to run their Hornby-Dublo railways through a Transformer. The introduction of the D.C. Converter makes it possible for Hornby-Dublo train owners who have D.C. current to run their trains from the mains just as easily, safely and successfully as with Transformers from A.C. Mains. More than this, the new Converter has two outputs of 10VA at 12 volts, and therefore provides sufficient current to run two trains at the same time, each on a separate track. To do this two No. 1 Controllers are needed, but only one Controller is required for one train. The standard winding of the D.C. Converter is for 210-240 volts, but it can be wound for other voltages.



The new Hornby-Dublo two-road Engine Shed built in the modern style.

How to Begin a Hornby Railway

A Chapter of Useful Hints

EVERY boy has an unconquerable desire to "play trains," and at this time of the year many are waiting patiently for their first train set. Now is the time to give Fathers and Mothers and Aunts and Uncles a broad hint as to which Hornby Train would be most appreciated!

One of the greatest attractions of a model railway is that, although commenced on a comparatively small scale, it can be extended as its owner becomes more expert, and tries to make his operations more and more like those carried out on real railways. With this in mind, a little guidance in regard to the choice of a Hornby railway will no doubt be useful. This article has been written with this in view.

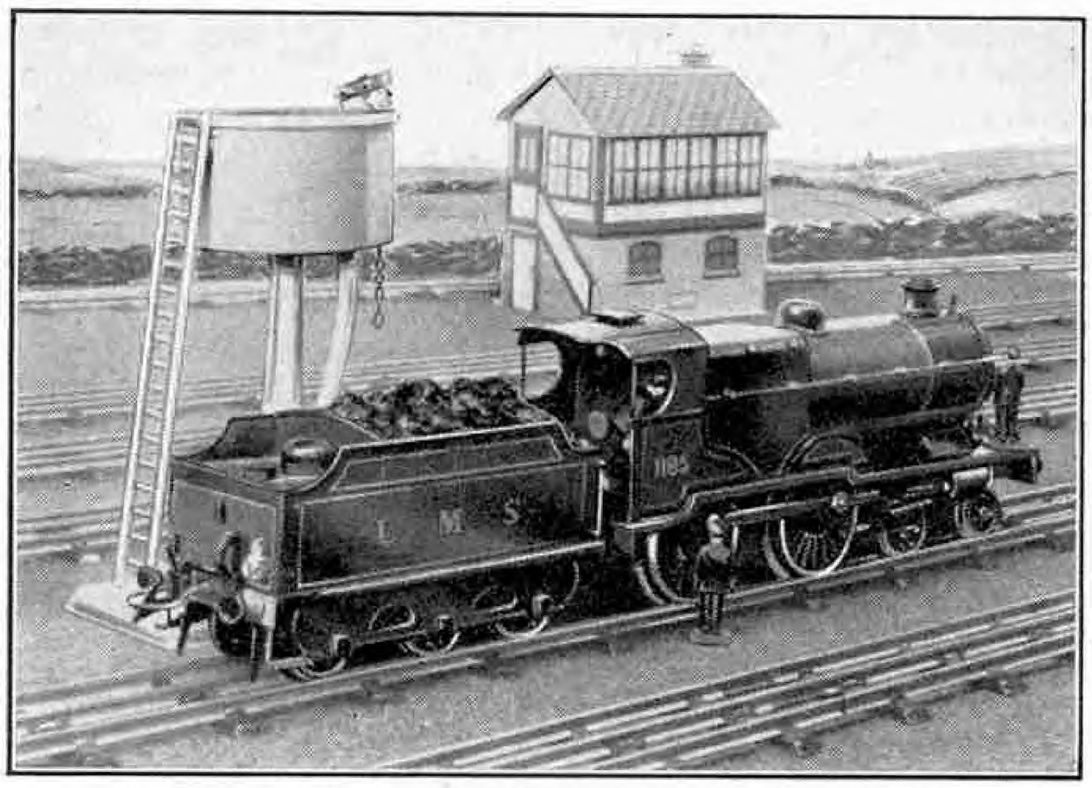
First of all there is the question of motive power, and here the choice lies between electricity and clockwork. Some boys, and many parents also, are under the impression that an electric railway is quite a complicated affair and is difficult to run, and that it involves a certain amount of danger to those operating it. This is entirely wrong. A Hornby electric railway is simple to install and is very easy to run; and there is not the slightest risk of shock to the operator, because at no point is the track in direct contact with the mains supply.

In homes where the electric mains supply is alternating current (A.C.) and not direct current (D.C.), the ideal Hornby railway is one of the 20-volt type run from the mains through a Meccano Transformer. The Transformer reduces the high-voltage mains current to low-voltage current safe and suitable for the railway. There are no elaborate arrangements necessary for working a layout. The Transformer is simply connected to any convenient lighting or power socket, and the transformed current is led to the track by means of the special Terminal Connecting Plate packed with every Hornby Electric Train Set.

As to the cost of running such an electric railway, this varies slightly, but generally speaking it may be said to be about as much as that of an ordinary household 60-watt lamp, or about 15 hours for the cost of one unit.

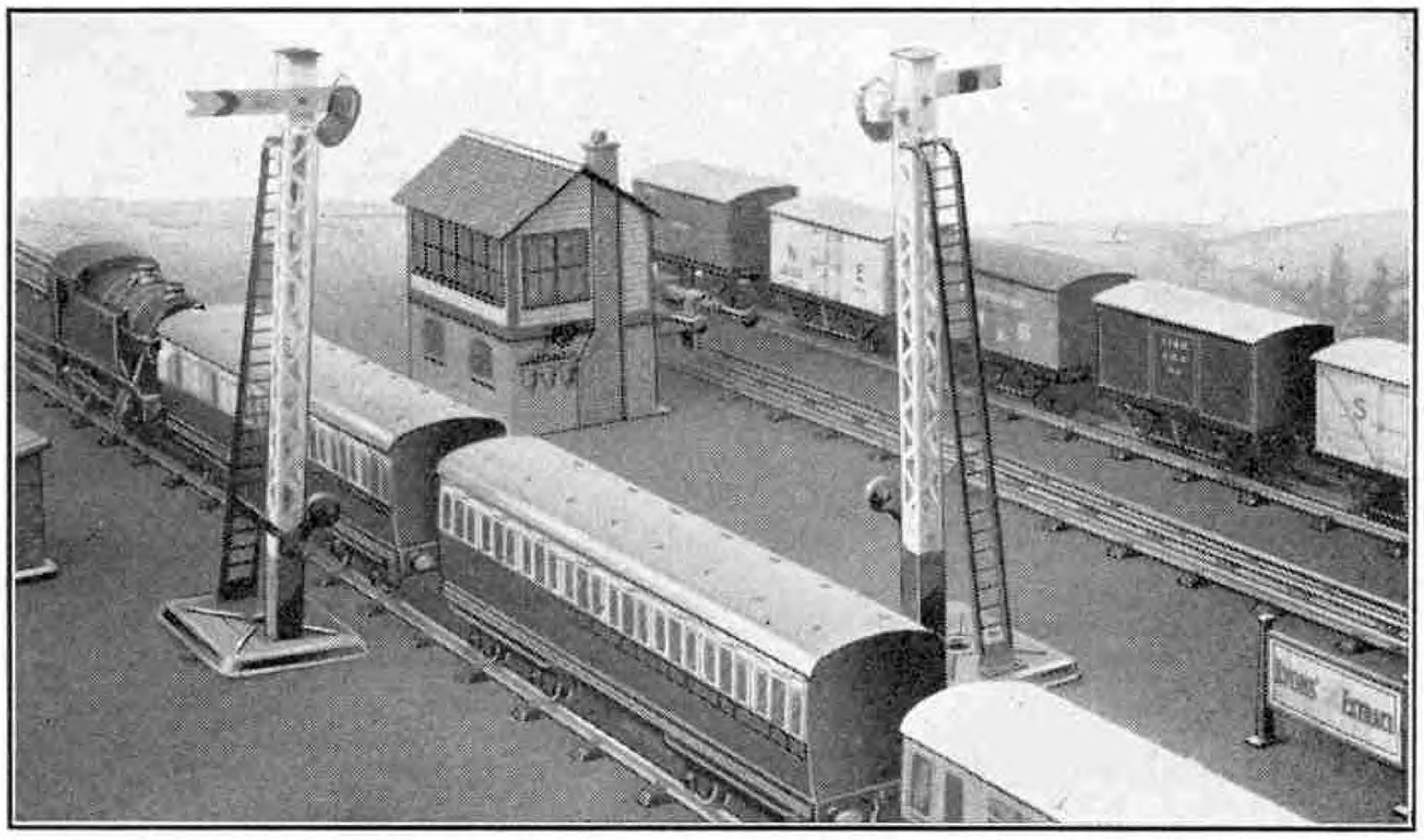
The outstanding advantage of the Hornby 20-volt system is that it provides all that is necessary for the development of a perfect miniature railway with all trains under the operator's control. The magnificent 20-volt automatic reversing locomotives can be started, stopped, controlled for speed and reversed entirely from the side of the track, without any handling of cab levers. This is a decided advantage.

All the Hornby Electric Train Sets from the No. E120 Special Sets upward are supplied with Hornby engines fitted with 20-volt automatic reversing motors. Also the splendid models of *"Eton"* and *"Princess Elizabeth"* are fitted with these motors. The smaller 20-volt electric train sets are not supplied with automatic reversing engines, but these engines can be reversed by hand by means of a lever in the cab, so that it is still possible to carry out shunting operations in a realistic manner.



The splendid automatic reversing Hornby E220 Special L.M.S. Compound Locomotive.

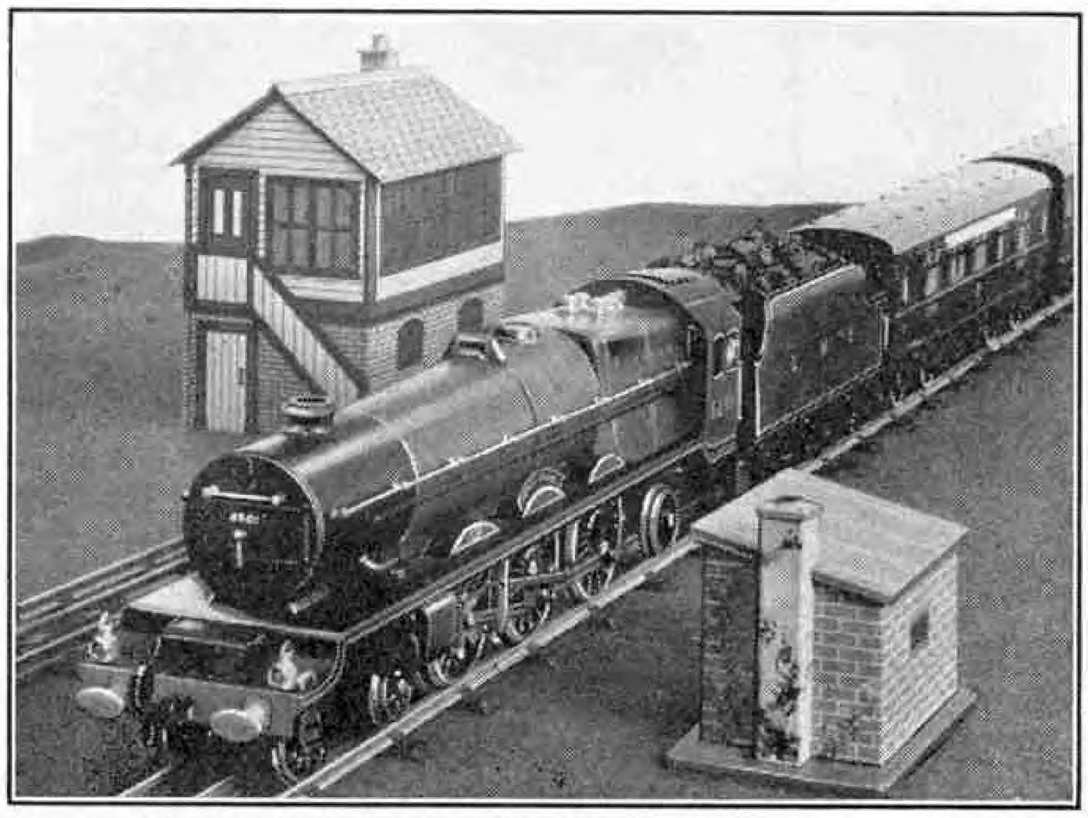
In many homes the mains supply is direct current (D.C.), which must never be used for running a Hornby Gauge 0 railway; and in others there is no mains supply at all; but these unfortunate circumstances do not prevent the installation of a Hornby electric railway, for Hornby Electric Trains can be run from suitable accumulators. The 20-volt trains require an accumulator supply of 14 volts only. There is also the 6-volt Hornby system requiring a 6-volt accumulator as the source of power. A good quality accumulator with a capacity of 20 ampere hours should be employed, and this can be recharged as necessary by any electrician at a reasonable charge. It is advisable to have two accumulators, so one is always available to



A G.W.R. suburban train hauled by an E120 Special Tank Engine passing a "distant" signal. This is allowable, but the train must be slowed down to pull up at the "home" signal if this is at danger.

carry on operations while the other is being recharged.

Where alternating current is not available, many boys will prefer clockwork as the motive power. The Hornby clockwork system has been improved over a period of many years to a remarkable degree of perfection, and the locomotives are now the strongest, fastest, and best pulling of their types in the world. Clockwork as motive power is specially suitable for railways on which it is intended to develop the fascinating pastime of timetable working.



"Princess Elizabeth," the pride of the Hornby range. This powerful model locomotive is capable of hauling heavy express loads.

When the question of motive power has been finally decided, the only important point that remains to be considered is whether the railway should be made up with 2 ft. or 1 ft. radius curved rails and points. If a reasonable amount of space is available, there should be no hesitation in choosing the 2 ft. radius track; for on this track it is possible to run all the locomotives and rolling stock in the Hornby System. On the other hand, 1 ft. radius track limits its possessor to the smaller locomotives and four-wheeled rolling stock, and in particular makes it impossible for him to use the 20-volt automatic reversing locomotives. In many cases, of course, space limitations will make it necessary to use the smaller radius track. In order to determine this point it should be borne in mind that a circle of a 2 ft. radius track requires an overall space of not less than 4 ft. 6 in. square. A 1 ft. radius circle requires a space of at least 2 ft. 6 in. square.

With few exceptions Hornby locomotives and rolling stock are available in the correct styles and colours of the four British railway groups, so that the new enthusiast can represent his favourite railway in miniature.

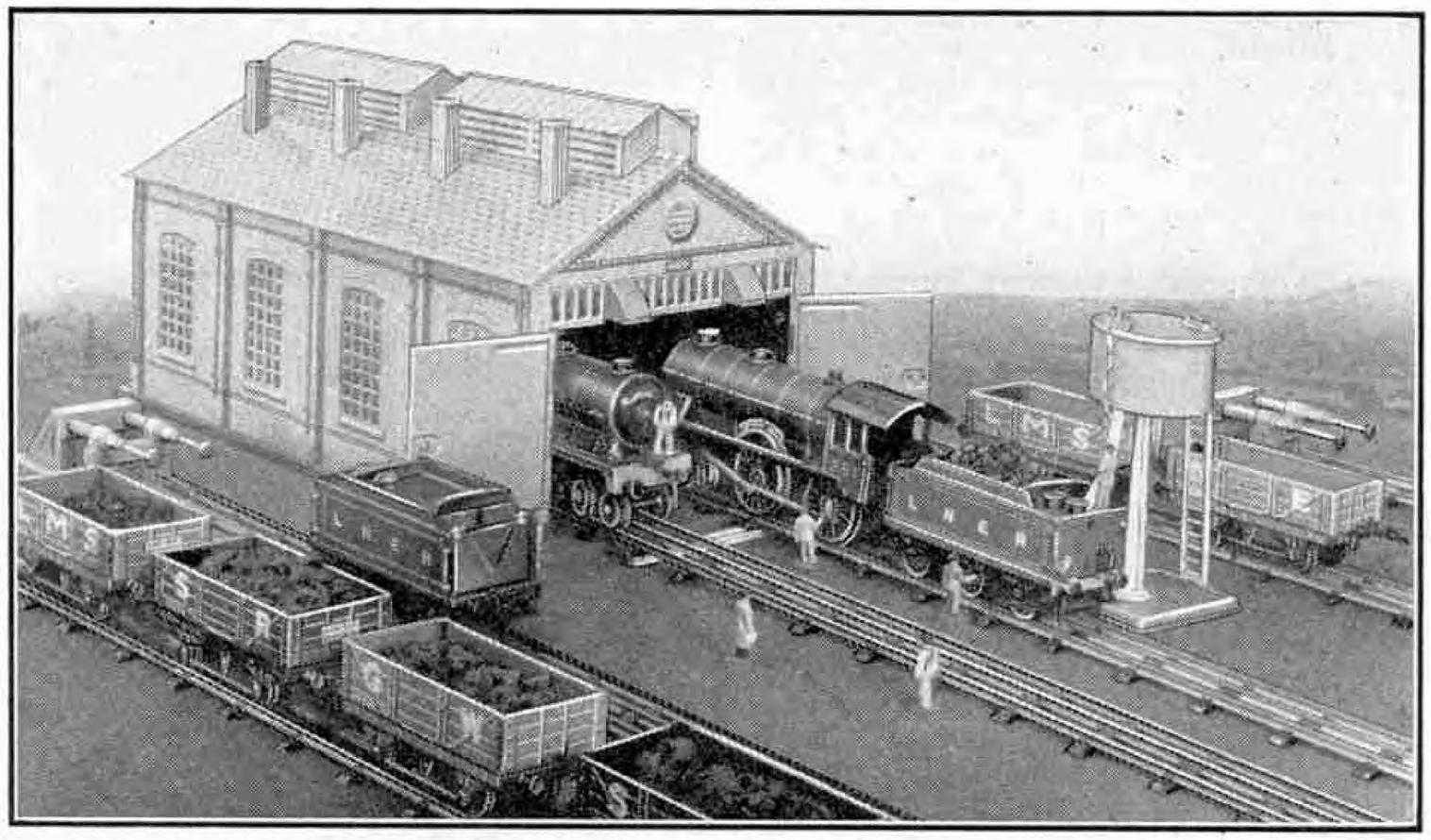
Many boys devote their attention mainly to the chief passenger trains of real practice and their reproduction in miniature. A splendid selection of trains can be run on a Hornby layout with the correct rolling stock, and it is great fun to plan and operate a train service to meet the requirements of the centres that are supposed to be served by a real line. The Hornby Pullman Coaches, for instance, which so closely follow their prototypes, can be assembled into complete trains that share all the characteristics of the well-known peacetime Pullman fliers. There is a definite thrill in operating such trains in miniature, especially if one is familiar with the real thing and has watched the departure or arrival or, better still, has travelled on the particular train that is being reproduced.

Hornby Corridor Coaches, too, for the less specialised services, allow splendid standard main line trains to be made up. A feature of these Coaches, and also of the Pullman Cars just referred to, is that they are provided with corridor connections so that a complete train can be vestibuled together in the correct manner. All boys appreciate the distinction that fittings of this kind give to a miniature train.

The goods traffic side of miniature railway working is particularly fascinating. The variety of wagons and vans that can be obtained is such that practically any kind of traffic can be dealt with on a Hornby Railway. Coal and mineral trains can be run, and livestock and perishable trains can be operated just as satisfactorily. General merchandise, bulky freights such as machinery, oil, petrol and even dangerous gunpowder traffic, all have their appropriate wagons.

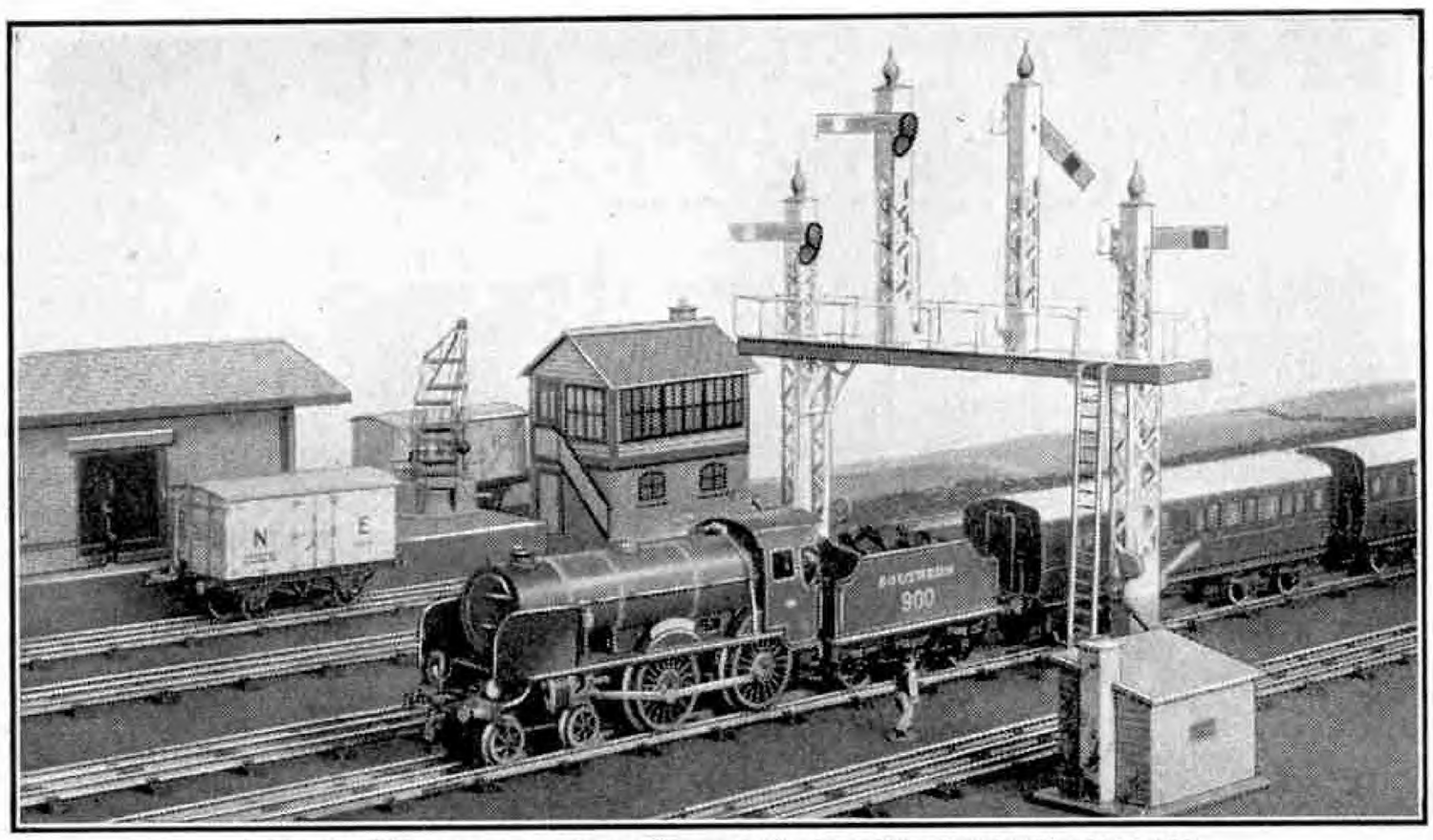
With each Hornby Train Set are packed sufficient rails to make a track circular or roughly oval in shape. Splendid fun can be had with this track, but soon its owner will want to extend and develop his layout. This can be done quite simply by the addition of extra straight rails that will increase the length or breadth of the layout. The next move is to add points, and with the splendid variety available in the Hornby System it is possible to make many different and interesting layout designs.

As the track is developed, sidings must be added to make the line railwaylike. Sidings are made with ordinary Right-hand or Left-hand Points, and they are terminated by Hornby Buffer Stops, of which there are different types available.



No layout is complete without a Hornby Engine Shed for housing locomotives when not in use. In this illustration "The Bramham Moor" is seen outside the shed taking water before commencing work.

Every layout should have at least one station. In the Hornby System there are four stations available, the simple No. 3 type, the No. 4 and the No. 4E—the last being electrically-lit—and the Island Platform.



A Hornby S.R. express passing underneath the imposing Hornby Signal Gantry.

Signals on a Hornby Railway

EVERY Hornby Railway enthusiast wants to include signals in his layout, because he knows that without them he cannot carry on operations in real railway style. Quite apart from this necessity, it is really good fun to operate the signals and run the trains in obedience to them.

The owner of a Hornby Railway will have no difficulty in realising this scheme, for all the signals that he will require are included in the Hornby Series. There is no mystery about the different types, as this article will show. The most important of all is the one that is called the "home" signal. This is the one that has a semaphore arm with a square end. The driver of a train must not pass such a signal when the arm is in the normal horizontal position. He can only do this when the signal is lowered or raised, so that the arm slopes up or down. Hornby Signals are of the type in which the arm moves downward.

In the Hornby Series there are "home" signals of four different types, ranging from the simple "M" Signals to the Nos. 1 and 2 Signals, which include more detail. For instance, No. 2 Signal has a dummy lamp attached to the post and a ladder for the use of the man who looks after the lamps. In addition to these there are the No. 2E signals, which are fitted for electric lighting.

The first position that will be thought of for "home" signals is at the departure ends of the platforms of stations, so that they can be properly lowered when trains are due to start. Junctions and crossings are other places where "home" signals can well be used. The semaphore arm must point to the left of the track over which the train concerned is approaching. On the side that then faces the train as it comes along the arm is painted red, with a vertical white stripe at a short distance from its outer end. Another help in correct placing is the position of the lamp. At night a red light is displayed when the arm is in the "danger" position, and a green light tells the driver that the line is clear. The signals therefore must be so placed that the lamps on them, whether dummy or real, will show these indications to the train as it approaches, and not as it runs away!

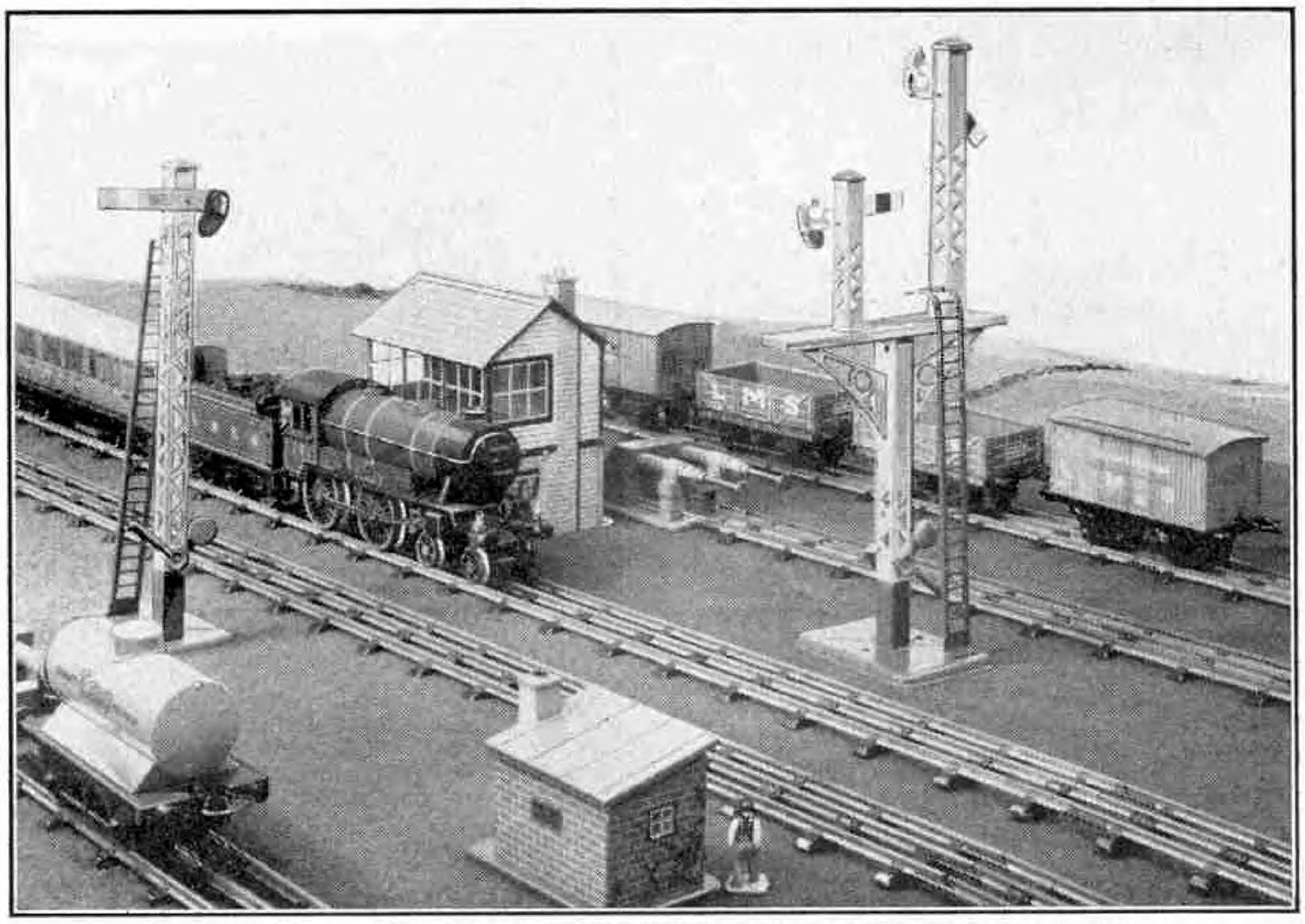
A miniature railway can be run quite well with only "home" signals, but the fun is greatly increased when "distant" signals also are used, as on real railways. These differ from "home" signals in having fishtailed notches cut in their outer ends, and the side facing an approaching train is painted yellow, with a black stripe parallel to the fishtailed end. Another difference is that at night they display an orange light, and not a red one, for caution.

The Hornby range of "distant" signals is designed to suit all types of miniature railway. For the smallest layouts there are the "M" Signals, very simple, but still realistic in appearance. The Hornby No. 1 and No. 2 Signals of the "distant" type are of improved construction, and have more detail, and the No. 2 Signals have transparent "spectacles" mounted in a frame of correct design. Then there are the No. 2E signals which, like the No. 2E "home" signals are equipped for real electric lighting.

The purpose of a "distant" signal is to give the driver of a train warning of what he may expect when the "home" signal comes in view. It is therefore placed ahead of the "home" signal with which it is associated. The distance between the two signals of each pair, comprising "distant" and "home," will depend on the size of the layout, but whevever there is room for a "distant" signal in conjunction with a "home" signal it should be brought in, and use made of it to control trains.

Signals with two arms on one post, or junction signals which have two posts one taller than the other and each carrying an arm look very railwaylike when they are included in a Hornby layout, and every Hornby Train owner will want them for use in special positions. Let us consider first the Hornby Double-Arm Signal. This carries a "home" semaphore at the top of the post, with a "distant" arm below it. It is intended for use where the section of track controlled by separate "home" and "distant" signals is so short that these would be too close together. The "distant" signal then is mounted on the same post as the "home" signal of the previous section. Thus the Hornby Double Arm Signal is really two in one—the "home" signal of one section and the "distant" signal of the next.

The Hornby Junction Signal, with its two posts of unequal height, is even more interesting. It should be placed where a branch leaves the main line. The semaphore on the taller of the two posts is lowered to show the main line is clear, and that on the shorter post to give this indication for the branch. Both "home" and "distant" Hornby Junction Signals are available.



Hornby single arm and junction signals. The tall signal gives the all clear for the main line.

HORNBY RAILWAY COMPANY COMPETITION PAGE

Join the Hornby Railway Company and become eligible for the competitions announced on this page.

Join the Hornby Railway Company and become eligible for the competitions announced on this page.

FINE PRIZES IN CHRISTMAS CONTESTS

Competitors entering for contests on this page should note that there are two main contests, one for the Senior Section members of the H.R.C. and the other for Junior Section members. The Senior contest is open to members who are 12 years of age and over, and the Junior contest to members under 12 years. On no account must members of the Senior Section enter the Junior Section contest, or vice versa. Railway Jokes and Stories Contest, which is also announced on this page is open to all H.R.C. members irrespective of sections.

Name Building Contest (Senior Section)

For the senior members this month we are combining the Christmas greeting in the centre of the page with an easy and interesting competition. The letters in the panel are to be used by competitors in the making of as many locomotive names as possible.

The rules covering this contest are quite simple. Every letter used in making up each name must be contained in the accompanying message. Any letter that appears twice in the greeting may be used twice in forming a locomotive name, but in no case must a letter be included more often than in the words in the panel. Only the names of locomotives at present run by the four main line companies are admissible.

With each name, the number of the locomotive represented must be given, and for convenience the names should be grouped according to the railways to which the engines bearing them belong, and to their classes. On the back of each entry must appear the name, address and H.R.C. membership number of the competitor, also the competitor's age. It should be remembered that this contest is for Senior members only, that is, all H.R.C. members of 12 years and over. The contest will be divided into the usual Home and Overseas Sections, and prizes consisting of any products manufactured by Meccano Ltd. to the value of 15/–, 10/6 and 5/– respectively will be awarded. In addition there will be several consolation prizes.

Envelopes containing entries must be marked *"H.R.C. Christmas Names Contest,"* Meccano Ltd., Binns Road, Liverpool 13. The closing date for the Home Section is 30th December; that for Overseas is 30th March 1940.

Cordial
Christmas Greetings
from the
Competition Editor

"Christmas Card" Contest (Junior Section)

For juniors this month we have selected an entirely new type of contest. All will have seen plenty of Christmas cards, and most of them may have noticed that very few of these show a railway scene. For this reason we are asking them to submit a Railway Christmas Card. There is no need to include any wording; as all that is required is an actual cover design, and the drawing itself may be in pencil or coloured. In order to give every member a good chance the prizes will be awarded for the originality of the design, so that lack of actual drawing skill need not prevent any member from entering.

The competition is divided into the usual Home and Overseas Sections, and prizes consisting of any Meccano products to the value of 15/–, 10/6 and 5/– will be awarded in each section. A number of consolation prizes will also be awarded. Each entry should have the H.R.C. membership number, name and full postal address.

Envelopes should be addressed *"H.R.C. Christmas Card Contest,"* Meccano Ltd., Binns Road, Liverpool 13. The closing date for Home competitors is 30th December, in the Overseas Section it is 30th March 1940.

Prizes for Railway Jokes and Stories

More jokes and "tall stories" are told, around the fireside or elsewhere, at Christmas time than at any other season of the year. I remember one Christmas party at which I first heard the story of the furious passenger who leaned out of his compartment as his train was moving out of the station and shouted to a porter: *"Why didn't you put my luggage in the train, as I told you?"* The porter replied: *"Your luggage is not such a fool as yourself. You're in the wrong train!"* I want as many good stories of this kind as I can get, and therefore am offering good prizes to members in a Railway Jokes Contest.

Entries in this competition must be written on one side of the paper only, and each member may send in as many jokes as he likes—the more the merrier. There will be two sections, for Home and Overseas members respectively, and prizes to the value of 21/–, 15/– and 10/6 are offered to the senders of the best railway jokes in each section. A number of consolations prizes will also be awarded.

Envelopes containing entries should be addressed to *"H.R.C. Railway Jokes Contest,"* Meccano Ltd., Binns Road, Liverpool 13. Every member entering the competition should be careful to write on the back of each sheet his name, H.R.C. membership number, and full postal address. The closing dates for this competition are: Home Section, 30th December, Overseas Section, 30th March 1940.

H.R.C. COMPETITION RESULTS

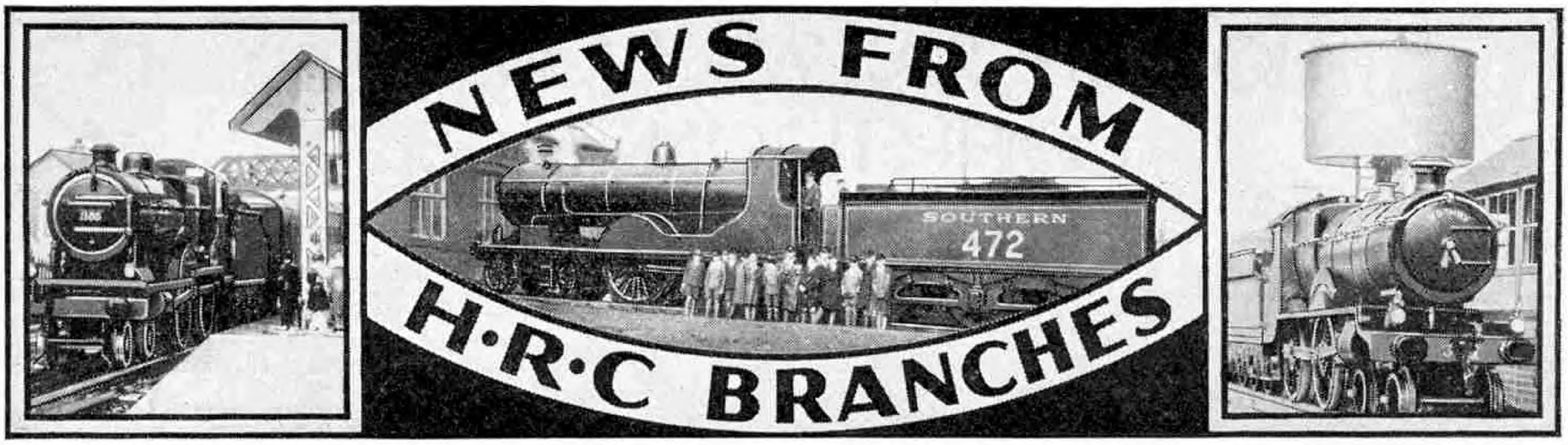
HOME

September "Drawing Contest" (Junior Section).—First: J. McIntyre (31781), Paisley, Scotland. Second: G. Hurst (58620), St. Helens, Lancs. Third: A. M. Lever (59736), Copnor, Portsmouth. Consolation Prizes: D. Jones (65631), Ellesmere, Shrops.; M. C. Neale (57838), Radcliffe-on-Trent, Notts.; M. K. Maxwell (33313), Lockerbie, Scotland.

September "Photo Contest No. 6."—First: D. Thorne (48560), Bootle, Liverpool 20. Second: E. Oldham (43390), Hyde, Cheshire. Third: J. Turley (18853), Tunbridge Wells, Kent. Consolation Prizes: B. Miller (47648), Liversedge, Yorks.; B. Sackville (60299), Wellington, Shropshire; F. Mills (31), Kearsley, Nr. Bolton; C. H. S. Owen (59677), Hale, Cheshire; R. F. Stephens (65845), Keston, Kent; T. Fletcher (6057), Perry Barr, Birmingham 20.

OVERSEAS

June "Marshalling Contest."—First: L. Haughton (7783), Johannesburg, South Africa. Second: E. W. Robson (60774), Auckland, S.W.1, New Zealand. Third: D. Price (63525), Auckland, New Zealand. Consolation Prizes: J. E. Ridgway (51742), Johannesburg, South Africa; D. Murison (37642), Buenos Aires, South America.



BEDFORD SCHOOL.—Special attention has been given to the track, which was laid down at special meetings and put in order in readiness for the running of both clockwork and electric trains. All the money in hand was devoted to track improvements in order to secure good running. Simple timetables are in operation at present, and these are gradually being made more complicated as members become more efficient. Secretary: F. E. B. Webb, 59, Rosamond Road, Bedford.

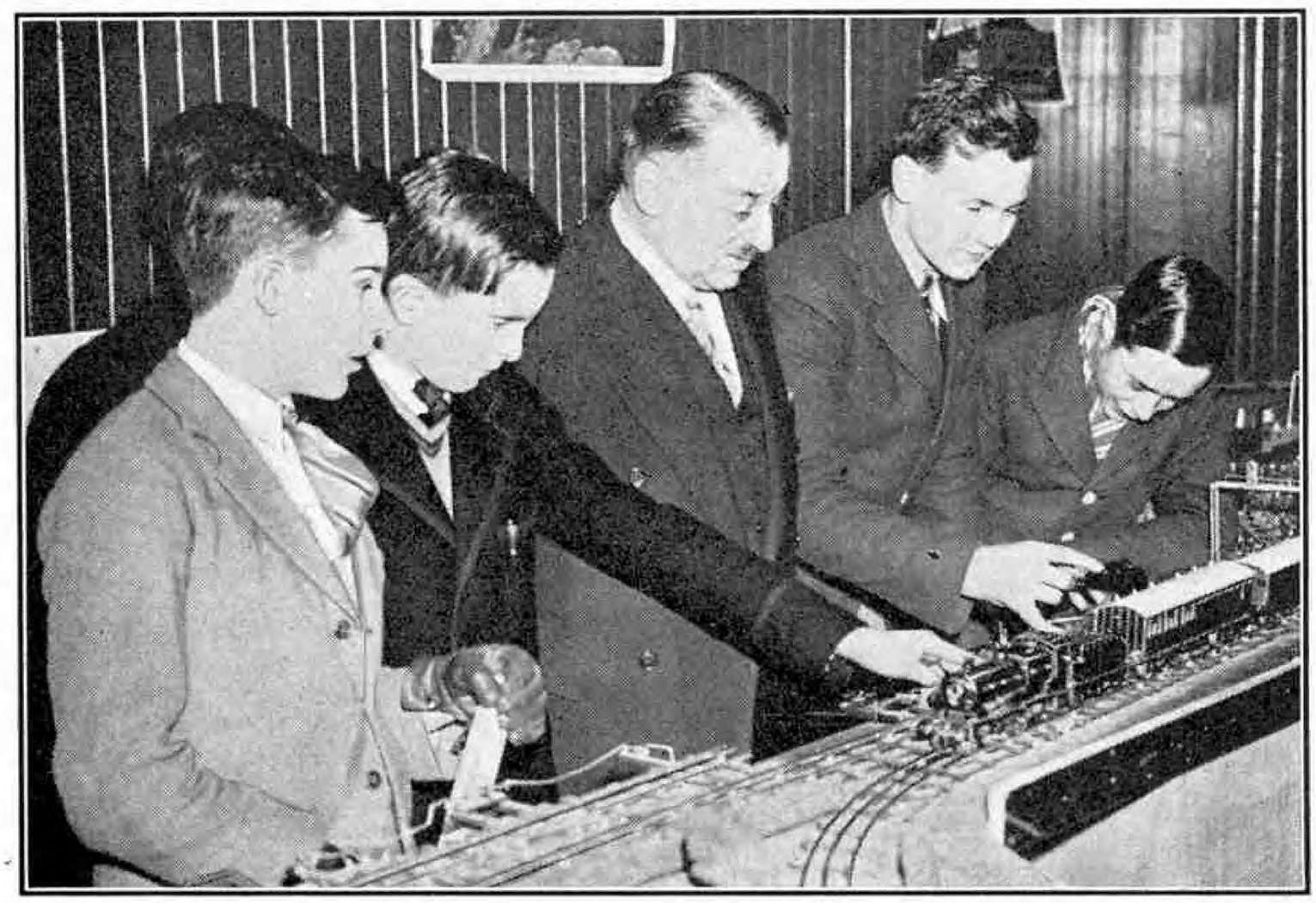
NORTHAMPTON.—Evening meetings have been suspended, but afternoon meetings are being arranged in order to keep members together. The limited programme is very disappointing, as the Branch had enjoyed a very interesting summer session, with splendid cricket and tennis, and members were looking forward to good times during the present winter session. Secretary: D. J. Rushton, 40, The Vale, Northampton.

DENVILLE MODEL RAILWAY CLUB (HAVANT).—The Branch has now taken possession of new Headquarters that are more convenient than those formerly in use, and an excellent track has been laid down. This consists of three circles with a flyover junction to join the innermost track to the one on the outside. Good attendances are registered at meetings, at which both electric and clockwork locomotives are used. The layout is to be extended to represent the S.R. line from Waterloo to Portsmouth. A Library has been formed and on the first day two books were loaned to members. Secretary: L. S. J. Adkin, "Myrtle Cottage," 4th Avenue, Denville, Havant, Hants.

ROSEDALE (BIRMINGHAM).—Activities have been continued as far as possible, in spite of war difficulties. One meeting was devoted to trial running in preparation for regular timetable work, and members have now settled down to track operations. Secretary: A. D. Hamblin, 19, Katherine Road, Bearwood, Birmingham.

Cabinet Minister Visits Edinburgh Branch

In the illustration on this page the Rt. Hon. Ernest Brown, M.C., M.P., Minister of Labour, is seen watching operations on the layout of the Schoolboy Model Club (Edinburgh) Branch. Officials and members of the Branch were proud to welcome their distinguished visitor, and our photograph leaves no doubt of his keen interest in what he saw. Mr. Brown was cordial in his approval of the splendid work of the Branch, of which Sir Nigel Douglas-Hamilton, A.F.C., is President.



The Rt. Hon. Ernest Brown, M.C., M.P., Minister of Labour, enjoying Hornby Train operations with officials of the Schoolboy Model Club (Edinburgh) Branch, No. 272, Leader, Mr. R. Croall. W. Wallace, secretary, is on the left of our photograph with T. Ingles, his assistant, and on the right are D. Begg and J. L. Samuel, Railway Leaders. The Branch has nearly 300 members and its extensive track, 200 ft. in length, is generously provided with accessories and scenery, including an airport.

NORTH BRITISH MODEL SOCIETY (DUNDEE).—Many members are engaged in the Services or in A.R.P. work, and special efforts are being made to send gifts of various kinds to those who are away in camp. Special regulations to be observed during the war period have been drawn up, and it has been decided to give more attention to amusement and pastimes. Scenic displays are being prepared, and one idea is to build a model of a town in A.R.P. Conditions. Work is continuing on both the indoor and outdoor sections of the track. Secretary: T. A. Sharpe, 12, King Street, Dundee, Angus.

LOUGHTON.—Members became very busy during October, doing repairs and oiling rolling stock in readiness for track meetings. There has been a good increase in membership, and the prospects are very bright, although a certain number of old friends have been lost temporarily owing to evacuation and other causes arising from the war. Recruiting is being speeded up. Members are interested in aeroplanes, and plans are already being made for a model aeroplane section next summer. Secretary: G. W. Ruffell, 10, Elmhurst Way, Avondale Drive, Loughton, Essex.

Proposed Branches

The following new Branches of the Hornby Railway Company are at present in process of formation, and any boys who are interested should communicate with the promoters, whose names and addresses are given below.

BEBINGTON—D. Woodward, 174, Higher Bebington Road, Bebington, Wirral.

BOURNEMOUTH—A. J. Mee, Kenrose, 9, Brightlands Avenue, Southbourne.

CARDENDEN—W. Duncan, "Helen Dhu," Kinglassie, Cardenden, Fife.

GILLINGHAM—F. Matthews, The Kendalls, Gillingham, Dorset.

LIVERPOOL—T. H. Hughes, 34, South Drive, Victoria Park, Liverpool 15.

LONDON—M. Procter, 280, Wickham Lane, Abbey Wood, London S.E.2.

LONDON S.W.11—K. Maycock, St. Barnabas' Vicarage, Lavender Gardens, Clapham Common.

LOUGHBOROUGH—M. L. Squires, 19, Bedford Street, Loughborough.

NEW ZEALAND—B. Paton, 193, Clyde Road, Fendalton, Christchurch, N.Z.

PETERSFIELD—B. Boniface, 2, Oaklands Road, Petersfield, Hants.

PONTYPOOL—D. Cross, The Crest, Usk Road, Pontypool, Mon.

WALLINGTON—B. Tatford, "Hillside," 20, Ingleby Way, Wallington.

Christmas Model-Building Competitions

Cheques and other Fine Prizes

Enter your Latest Model in this Contest

This month we announce another of the popular general competitions in which Meccano models of all kinds may be entered. There are no restrictions in regard to size, and every reader who is building a Meccano model of any kind should not fail to enter it in this contest. Readers who have models already built up may submit these if they wish, but no models that have already won prizes in previous "*M.M.*" competitions are eligible.

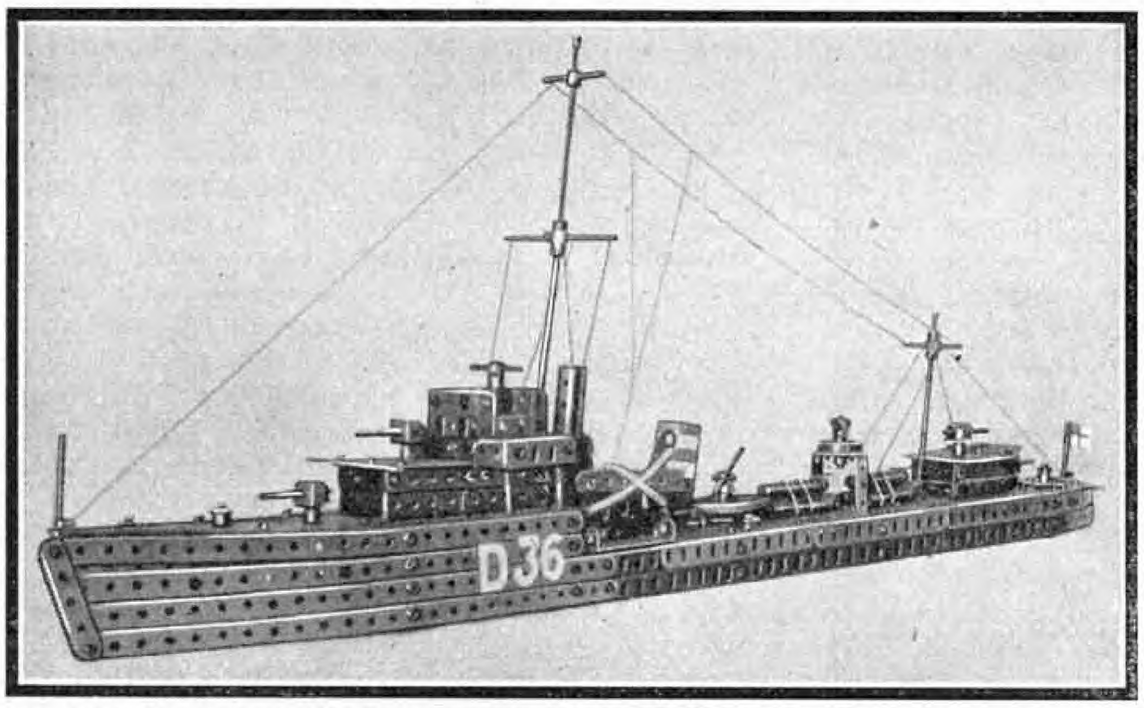
It should be the aim of every Meccano boy to take part in each of the model-building competitions announced in the "*M.M.*" for they afford a valuable opportunity of measuring his model-building ability with that of his fellow Meccano boys, and the practice gained by working in competition with others will help to improve his skill. The present contest, in which competitors are allowed free choice of subject, provides an excellent opportunity for new readers to make a start.

All that is necessary in order to enter a model in this competition is to have it photographed, or make a drawing of it, and then send the photograph or drawing to "*Winter*" *Model-Building Contest*, Meccano Ltd., Binns Road, Liverpool 13. The competitor's age, name and address should be written on the back of each photograph or drawing submitted.

Readers whose models incorporate special features not clearly shown in the photographs or drawings should write a short description that will make everything clear to the judges, and enclose this with their entries. The description should be as brief and concise as possible, and there is no need to explain every detail of the model.

Readers of all ages are eligible to enter this competition, and if they wish may send in more than one entry, provided all are enclosed in the same envelope. No competitor will be awarded more than one prize, however; if several models are sent they will be grouped together and judged on their joint merits.

Entries will be divided into two sections, A, for competitors over 14 years of age; B, for competitors under 14. A separate set of prizes as follows will be awarded in each section for the models that the judges consider to be the most original and best built: 1st, Cheque for £3/3/–. 2nd, Meccano or Hornby products value £2/2/–. 3rd, products value £1/1/–. There will be also five prizes of products value 10/6 and a number of consolation awards in each section.



A model of a destroyer that won a prize for A. M. Messenger, Rochester, in a recent "M.M." competition.

Readers who are successful in winning prizes will be allowed to make their own selections of products to the value of their awards from current Meccano and Hornby Train price lists.

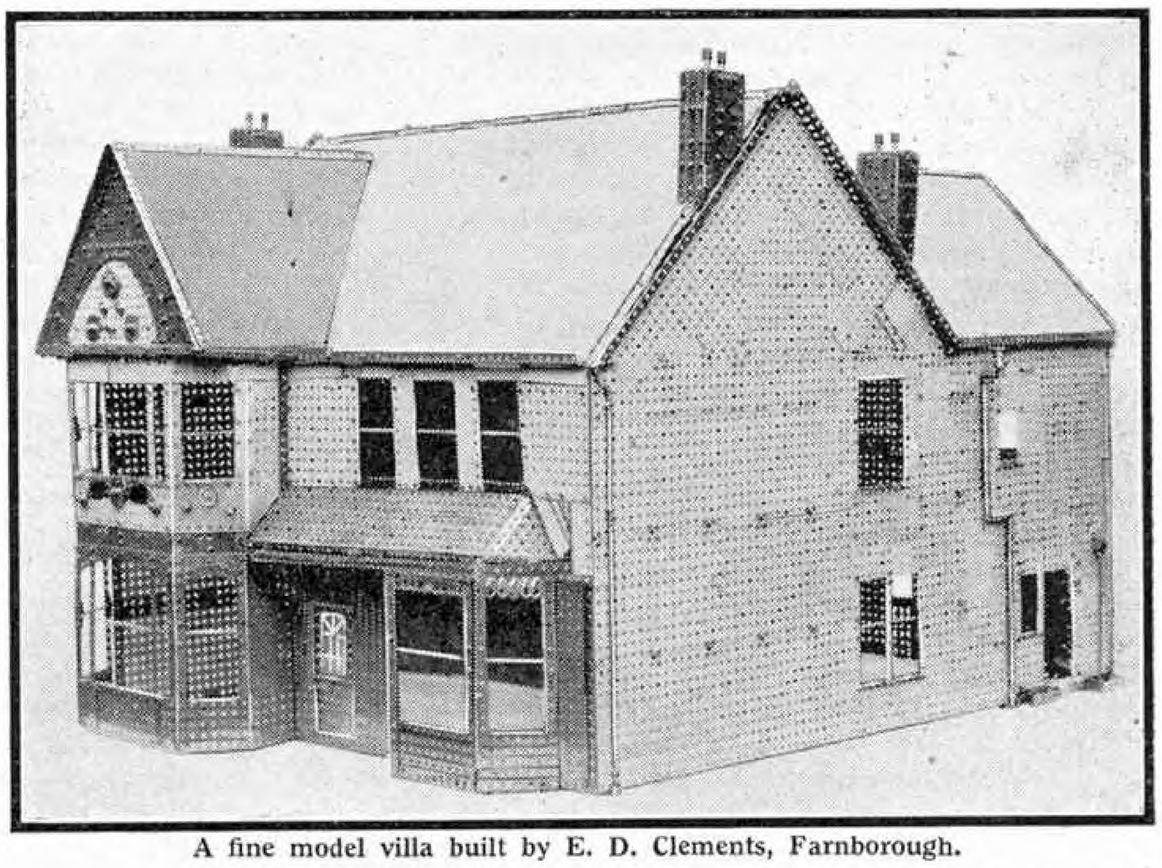
Competitors should post their entries in time to reach Liverpool before 28th February 1940. Any entries received after that date will be held over for entry in the next suitable competition announced.

It should be noted that photographs or drawings of prize-winning models become the property of Meccano Ltd., but unsuccessful entries will be returned to senders if a stamped addressed envelope of the necessary size is sent with an entry for that purpose.

Prizes for Model Castles and Houses

In this competition competitors are asked to submit models of houses, castles, monuments, or any other architectural structures. Previous competitions of this kind proved very popular and numerous readers have written asking us to organise further similar contests. The building of architectural models provides an interesting change from the construction of mechanical models, and Meccano parts are just as well suited for making castles, monuments, churches and houses as they are for building bridges, cranes, motor cars, ships, and other engineering structures.

A fine example of the kind of models suitable for entry in this contest is the splendid model villa illustrated on this page. It must not be thought that because the model shown is large that a big Outfit is necessary for success in the contest. This is not the case, and small well-built models will have just as good a chance as the most elaborate structures submitted. Every reader will be familiar with some structure that he can reproduce, and illustrations of suitable architectural subjects for models are easy to obtain. Photographs of many fine buildings that would be excellent for reproduction have appeared from time to time in the "*M.M.*"



A fine model villa built by E. D. Clements, Farnborough.

The competition is open to readers of all ages and there will be one section only. A competitor's age will be taken into consideration, however, in judging his work. Meccano parts should be used wherever possible in the construction of models, but competitors may use cardboard or other materials for filling in wall spaces and roofs if they do not possess sufficient Meccano parts for this purpose.

Competitors should choose their subject very carefully. If only a small Outfit is available the best selection will be a monument of simple type, or a small building such as a summerhouse or a sports pavilion. Any size of Outfit may be used in building models, but models built from small Outfits, providing they are neat and well built, will receive just the same consideration as large models.

Competitors should note that actual models must not be sent. A good photograph or drawing is all that is necessary. If possible it is best to send a photograph, as this will give the judges a better idea of the appearance of the model than is obtainable from a drawing, unless the latter is very well prepared.

Each competitor should write his age, name and full address on the back of each photograph or drawing submitted and should address his entry to "*Architectural Model-Building Contest*," Meccano Ltd., Binns Road, Liverpool 13. The competition will remain open until 28th February 1940.

A First Prize of Meccano or Hornby products value £3/3/– will be awarded for the best built and most interesting model received. There will be also a Second Prize of products value £2/2/- and a Third Prize of products value £1/1/–. In addition there will be five prizes of products value 10/6.

Building a Meccano Dynamo

An Easily-Constructed Working Model

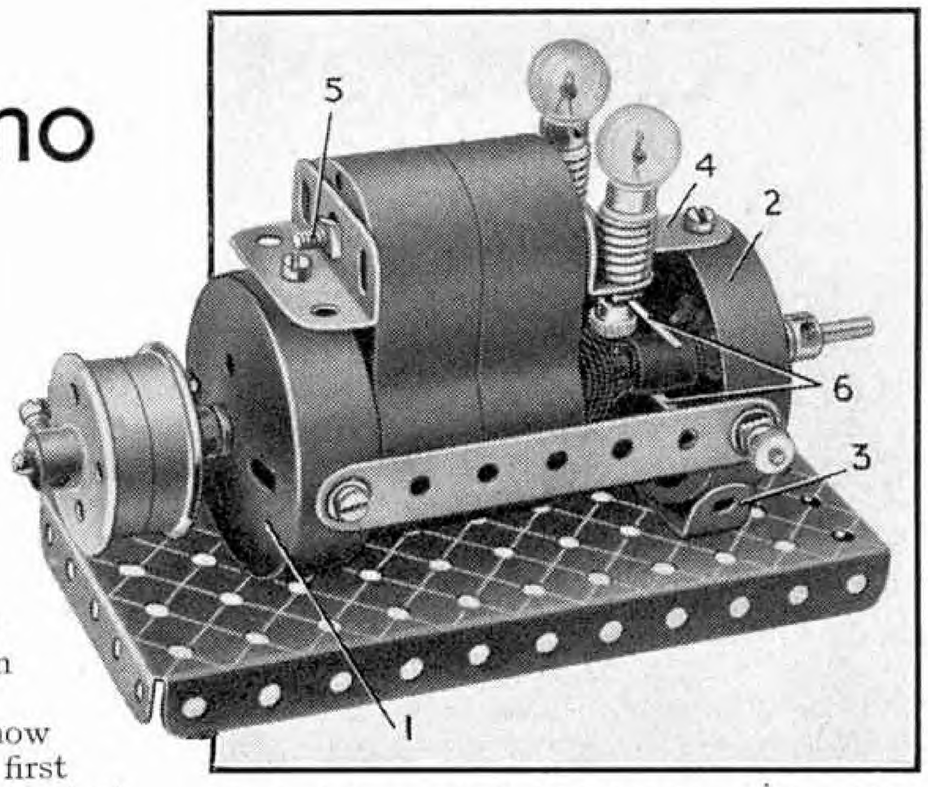


Fig. 1. A dynamo built from Meccano parts and two special permanent magnets.

LAST month we described various small electric motors that can be constructed easily from a few Meccano parts and one of the fine cobalt steel permanent magnets described and illustrated on page xvii of this issue. Many readers who have built up these motors have written to tell us how pleased they are with them. We are now describing the construction of a small dynamo that can be built up in an equally easy manner from the same materials. This is capable of generating sufficient current to light one or two 2.5-volt bulbs. The model also works excellently as a motor, and develops remarkable power for its size when it is connected to the terminals of a Meccano Transformer-Rectifier or a 6-volt accumulator. Two of the specially powerful permanent magnets that can be obtained only from Meccano Ltd. are used in this splendid model, and their employment is the secret of its efficiency.

The first step in the construction of the dynamo is to build up the armature, which is shown in Fig. 3. It consists of 42 Discs, each $1\frac{1}{4}''$ in diameter and slotted as shown in Fig. 2, and the assembly is fixed in position on a Rod by means of Seccotine.

The slots are $\frac{1}{4}''$ wide by $\frac{3}{16}''$ deep, and the Discs can be cut singly or they can be clamped on a Screwed Rod so that the slots of all of them may be cut out together. The best way is to use a hacksaw to cut the Discs to the required depth on each side of the slots, and the unwanted material is then removed with a chisel, or a screwdriver and hammer. The sides of the slots should be smoothed off with a small flat file, and care should be taken to see that all sharp edges are removed.

The next step after fixing the Discs on the Rod is to insulate the slots with thin brown paper. A disc of paper is first glued over each end of the assembly of Discs, and then strips folded into pieces of U-section are fitted in the slots and glued in place. The strips must be of such a length that they overhang the ends of the armature and they must also project from the tops of the slots by about $\frac{1}{8}$ in.

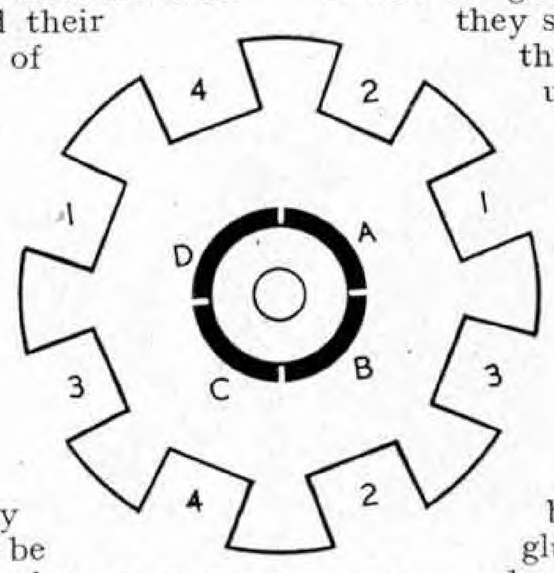


Fig. 2. This diagram shows the arrangement of the armature slots and commutator segments of the Meccano dynamo.

Winding can now be commenced and care must be taken to see that all the coils are wound in a clockwise direction. The wire to use is No. 30 gauge double cotton-covered copper, and about 250 turns of this is to be laid on each pole. Alternatively No. 26 gauge S.C.C. Copper Wire, Elektron Part No. 1586, can be used.

Reference to Figs. 1 and 2 will show how winding is carried out. The first two coils are wound in the slots marked 1 and 3 in Fig. 2, and the last pair in slots 2 and 4. The wire should be wound as neatly and carefully as possible, otherwise difficulty may be experienced in getting the required number of turns in the slots. It may be found that the last few turns of each coil project above the slots, especially if No. 26 gauge wire is used, and if so they should be tapped down with the wooden haft of a hammer until they are flush with the surface of the metal. The edges of the insulating paper can then be folded over the windings and glued in place to protect them from damage.

The next step is to build up the commutator, which can be seen in Fig. 3. First a Coupling is wrapped in two turns of brown paper, the paper being glued in place. Then a strip of sheet tin, brass or copper $\frac{5}{8}''$ wide and $1\frac{1}{4}''$ long is cut into four pieces of equal size to form the segments. The pieces are bent around the circumference of the Coupling in such positions that their edges do not touch each other, a small gap of about $\frac{1}{16}''$ being left between each pair of segments. They are secured in place by a few turns of cotton, sufficient space being left at the rear end to fix the ends of the armature windings in place. The commutator should now be fixed on the armature shaft so that the positions of the segments in relation to the armature poles are as shown in Fig. 2.

The connections can now be made, and the wires can be either soldered to the commutator or bound in position with cotton. The former method of course is the best. The beginning of the coil wound in slots 1, Fig. 2, is connected to segment A and the end of this coil to segment B.

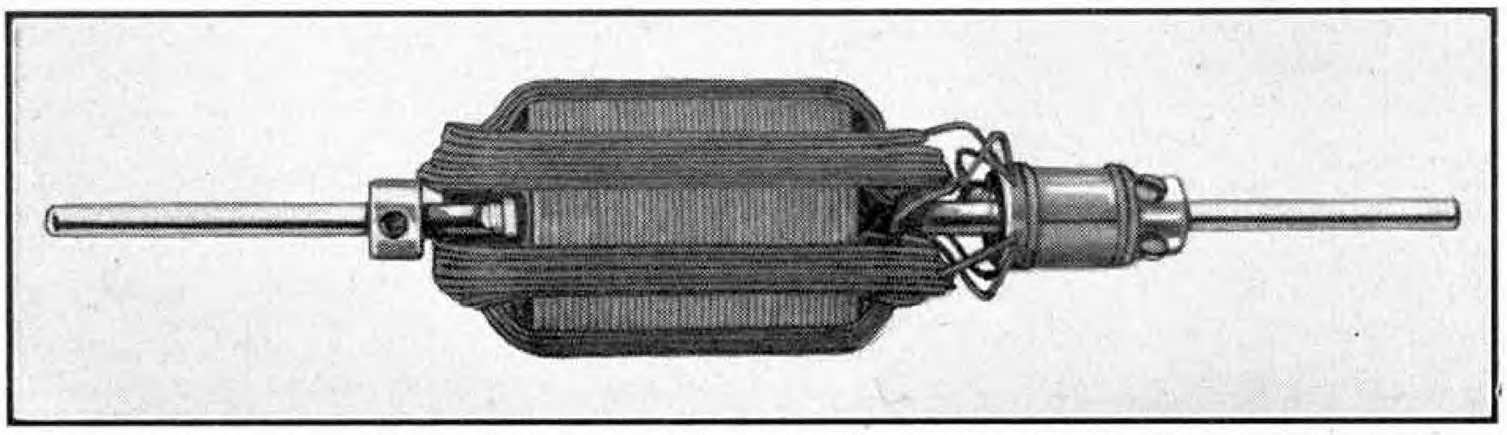


Fig. 3. The armature and commutator of the Meccano dynamo, showing the arrangement of the windings.

The beginning of coil 2 is wired to segment B and its end to segment C. Similarly, coil 3 is wired to segments C and D, while the beginning and end of the last coil 4 are connected to the segments D and A respectively. In picking out the ends of the coils it is helpful to bear in mind that the coils have been wound on in a clockwise direction.

The construction of the field magnet housing and the remaining parts of the dynamo is straightforward. As shown in Fig. 1, the base is a $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate, to which two Boiler Ends 1 and 2 are bolted after the armature has been placed in position. A $1\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip 3 is used as a strengthening piece. A $3\frac{1}{2}''$ Strip 4 is then bolted to the Boiler Ends, one of the bolts holding also a $1\frac{1}{2}''$ Angle Girder. The two permanent magnets are now slipped into position by first passing their open ends over the commutator. After they have been adjusted to clear the armature poles they are then clamped between the two $1\frac{1}{2}''$ Angle Girders by the $2''$ Screwed Rod 5. Further $3\frac{1}{2}''$ Strips are bolted at each side of the Boiler Ends, and the ends of the Strips nearest the commutator are fixed in position by insulated 6 B.A. Bolts fitted with Terminals. The 6 B.A. Bolts hold also the Commutator Contact Brushes. These are Elektron Parts No. 1559, which are suitably bent so as to make good contact with the commutator. Their positions should be adjusted until the best results are obtained, and this should be done while the dynamo is actually being driven. If desired two pocket lamp bulbs can be mounted in Lamp Holders (Part No. 183) on one of the $1\frac{1}{2}''$ Angle Brackets securing the magnets as shown in the Fig. 1. The Lamp Holders should be wired up to the brush Terminals.

To give satisfactory results the dynamo must be driven at a speed of about 4,000 r.p.m. and the best forms of driving unit are an electric motor or a water motor. Where neither of these sources of power are available some simple form of hand-driving with a step-up ratio can easily be arranged by means of Meccano pulleys and belts. The dynamo itself is driven through a pulley consisting of two Flanged Pulleys fixed face to face on the shaft.

It is important to see that the armature rotates truly in the bores of the magnets. This point should be attended to carefully when the nuts on the Screwed Rod 5 are being tightened up.

With the Model-Builders

A FINE MECCANO DOBBY LOOM

On this page is illustrated a fine Meccano model of a dobby loom designed and built by Mr. J. Westhead, Brinnington, Stockport. The essential feature of a dobby loom is a long belt of "lags," which in actual practice are bars of wood fitted with pegs. The positions of the pegs can be altered at will, and the lags are used to actuate the heald frames in a predetermined sequence and thus produce the required pattern in the material being woven. The number of lags in use at any time can be varied, and many are needed for intricate patterns.

In the model illustrated there are 48 lags consisting of 3½" Strips. The pegs are bolts fitted in the holes at predetermined positions, the heads of the bolts acting as cams that operate levers coupled to the heald frames. The material woven has 60 warp threads and is approximately 1¼" wide. The model incorporates five heald frames for pattern weaving and two for plain weaving, and they are operated by levers set in action by the mechanism seen at the top of the model on the left-hand side.

We understand that Westhead is now working on the construction of a model Jacquard type loom and we hope to include an illustration of this in due course.

MODIFICATION TO PIVOT BOLT

Several model-builders have suggested that the plain shank of the Pivot Bolt should be lengthened to ⅝ in., so that the part could be used to carry ½" or ¾" Pinions or 1" Gears. At present it is usual to use a ¾" Bolt for this purpose, and a typical instance of this is seen in the pre-selector epicyclic gear-box described in "*Suggestions Section*" last month. In this model all the planetary gears and Pinions are mounted on ¾" Bolts.

As the Pinions fit only loosely on the shanks of the Bolts, a Pivot Bolt adapted as suggested would be an improvement, but instead of modifying the existing part we think it would be better to introduce an entirely new Pivot Bolt as the existing one has many uses that would be impaired by the suggested alteration. For example, the Pivot Bolt is designed for use with the Pawls, and it also has many useful applications in differential construction.

We are giving the idea careful consideration, and shall be glad to learn the opinions of other model-builders on the subject.

STORING DINKY TOYS

Dinky Toys collectors will know the importance of keeping their miniatures in their appropriate boxes, for although the enamel in which these famous Toys are finished is of the finest quality it is liable to become scratched if models are stored loosely in one box and allowed to knock against each other continually. J. Lansdown, Coulsdon, tells us of the novel way in which he keeps his Dinky Toys neatly in their original boxes. He uses small elastic bands which he threads through holes in the bottom of the box. In the case of Dinky Toys sets such as "Ships of the British Navy" and "Famous Liners," the holes are already provided in the cartons in which these sets are sold. The ends of the bands are threaded through the holes and are tied together underneath the box. The Dinky Toys are slipped under the bands and are thus prevented from moving about inside the box.

THE CORD ANCHORING SPRING

Newcomers to the Meccano hobby often write to us for advice on the use of the Meccano Cord Anchoring Spring. This Spring is designed specially for attaching Cord to Meccano Rods in a neat and secure manner. To fit the Spring, it is first pushed on the end of the Rod and then "screwed" along it, the Spring being turned in such a direction that its coils tend to open. If the Spring is turned in the opposite direction it will "lock" on the Rod, and if force is used the Spring will be damaged.

A MECCANO "JUMPING BEAN"

Details of a novel Meccano "jumping bean" that will cause much amusement and interest at a Christmas party has been sent to us by S. Wick, Belfast. All that is required to make the "bean" is a piece of tin foil, about 1½ in. wide, and a Meccano Steel Ball, Part No. 117. A piece of the foil used for wrapping cigarettes and chocolates is suitable.

The foil is rolled around a piece of wood ⅜ in. in diameter, about ⅜ in. of tin foil projecting over one end of the wood. The projecting end is then moulded over with the fingers so as to close the end of the tube. The tin foil is then removed from the wooden rod and a Meccano Steel Ball is dropped inside, after which the open end of the tube is closed.

The "bean" should then be placed in a small box and shaken up vigorously to smooth creases in the tin foil. When it is placed on a plate and the latter is tilted slightly, the bean will "jump" about in a most amusing manner and will greatly puzzle those who are not in the secret. They will be sure that there is something alive in the little packet, just as there is in the well-known Mexican jumping bean, which twists and turns about in the same manner as Wick's device when it is put in a warm place.

MECCANO LOCK-NUT MECHANISMS

Although nuts and bolts are the simplest of Meccano parts, they are nevertheless the main components of two very important lock-nutting systems. As some young model-builders appear not to understand the purpose and applications of these very effective methods of pivoting Meccano parts, we are including a few notes on the subject here that we think will make matters clear.

There are two distinct types of Meccano lock-nut systems. One of these is employed when it is necessary to pivot two or more Strips so that they can move independently of each other. The pivot is assembled by passing a bolt through the appropriate holes in the Strips and securing two nuts on the end of its shank. By means of two spanners, or one spanner and a pair of pliers, the nuts are then rotated in opposite directions, until they lock together tightly. Before the nuts are tightened up they should be adjusted on the shank of the bolt so that the lower one does not grip the Strips but allows them to move freely.

The second method of lock-nutting is used when it is necessary to pivot two parts together in such a manner that one can move freely while the other is stationary. In this case the bolt forming the pivot is passed through the proper hole in the Strip that is to be movable and a nut is screwed on its shank. The remaining portion of the shank is then passed through the fixed Strip, and a second nut is placed on the shank of the bolt. The two nuts are then rotated in opposite directions by means of spanners so that they lock tightly against the faces of the Strip that is to remain fixed.

It will be noticed that in this system the pivoted parts are spaced the thickness of a nut away from each other, while in the first method the parts are almost in line.

An important point to remember in assembling these pivot mechanisms is to twist the spanners very firmly in opposite directions, so that a good lock is obtained. The nuts then will not work loose when the model is in motion.

MOTORS FOR MODEL BOATS

Model-builders have written to us from time to time regarding the use of the Meccano Clockwork and Electric Motors for propelling model boats. The larger Meccano Clockwork and Electric Motors are not suitable for such a purpose, but the E1 Motor (6-volt) forms a compact driving unit that may be used in cases where there is sufficient space in the hull. Reduction gearing must be introduced between the armature shaft and the propeller shaft, and this must have a ratio of about 12 : 1. The gears can be arranged to drive either a single shaft or twin shafts.

Those who wish to use a clockwork motor in their model boats will find the spring motor used in the Hornby No. 3 Speed Boat a good unit for the purpose. This motor is very powerful for its size, and it is ideal for driving lightly-constructed boats up to about 20 in. in length. The frame of the motor is provided with two holes at the rear end so that the motor may be bolted in position. The forward end of the motor frame carries a lug, which should be inserted in a small slotted bracket secured to the hull. A special three-blade propeller complete with shaft can be supplied for use with this Motor.

NOVEL BICYCLE LAMPS FOR THE BLACK-OUT

The lighting restrictions during the black-out have set inventive model-builders racking their brains to design suitable lamps for their bicycles. The most interesting idea we have yet heard of comes from R. Parkerson, Great Yarmouth, who has found a use in this respect for the Meccano Lighting Set. The front lamp is made from a box measuring 5½ in. × 3 in. × 2¼ in. and in this is housed the battery and switch. A hole is cut in the bottom of the box and a Headlamp taken from the Lighting Set is clamped in position behind it. The hole is fitted also with a watch-glass of the same diameter as the headlamp, this serving to prevent moisture entering the box.

The housing of the rear lamp measures 2½ in. × 1¾ in. × 1¾ in. and accommodates a second Headlamp with a red Disc inserted in its rim. The wire from the Pea Lamp is first wound around a wooden rod fixed across the box and is then connected to leads running from the battery of the front lamp. The rear lamp also is fitted with a watch glass.

We shall be pleased to hear from other readers who have interesting ideas on this subject.

A SIMPLE STEERING MECHANISM

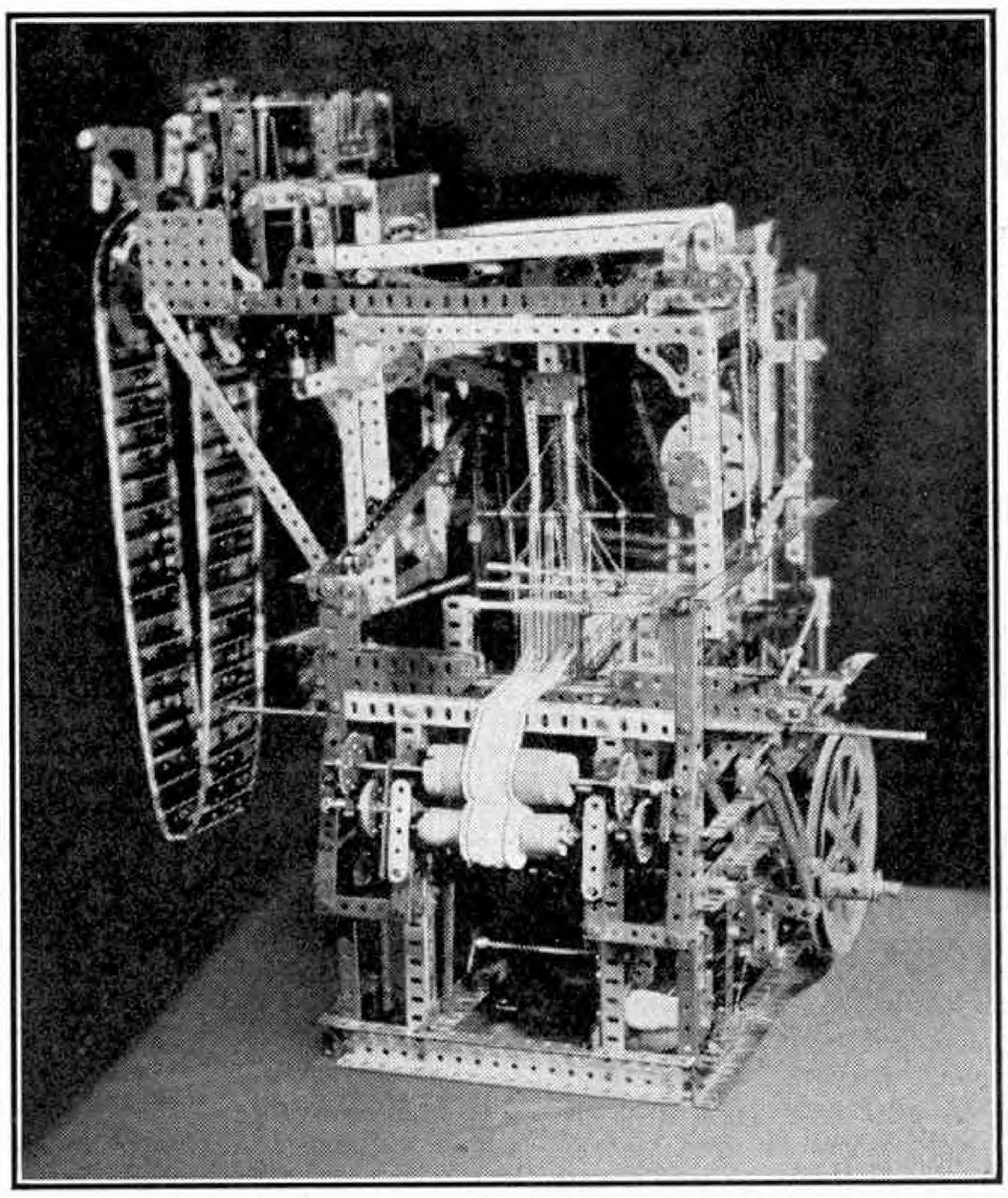
R. Shilcock, Cheltenham, South Australia, has sent us details of a very simple steering mechanism he has designed for a model car. It is based on the mechanism shown in Fig. 1 on page 110 of the "*M.M.*" for February last, but is of an even more simple nature. The tie-bar is a 3½" Strip fitted with a Single Arm Crank at each end, by means of which connection is made to the front wheel pivot. One end of the 3½" Strip is pivotally connected by means of a 2½" Strip to a Bush Wheel on the steering column.

The scheme is a good one and will appeal to model-builders who do not possess sufficient parts to build up the more elaborate forms of steering gear.

MODIFICATION TO SUGGESTION No. 442

In No. 442 of "*Suggestians Section*" in the "*M.M.*" for July last we described a useful remote controller for a reversing electric motor. This was submitted to us by A. A. Imlay, Skene. It has been built up by many readers, and generally has been found quite satisfactory. Imlay recently submitted a modification to his original mechanism with the object of improving its operation still further. He finds that in practice the vibration set up when the Motor is in motion tends to make the Motor switch move to the "off" position. This can be prevented by his new scheme.

An Aeroplane Collar, Part No. P.52, is pushed into each Elektron Magnet Coil so that it projects slightly at the ends of the Coils nearest to the Motor switch. A 4" Rod carrying a Coupling is fastened loosely to the switch arm by a bolt passed through the arm into a tapped hole in the Coupling. If this method is adopted a longer travel is given to the switch arm, as the ¾" Bolts used as "stops" in the original mechanism can be removed. In the revised design the ends of the Coupling strike the projecting Aeroplane Collars and thus limit the travel of the switch.



A fine model loom capable of weaving material in various patterns. It was built by J. Westhead, Stockport, and some of its main features are described on this page.

IMPROVED SCREWDRIVER

The Meccano Spanners and Screwdrivers have been the subjects of many different suggestions submitted by readers in the past, and one of the ideas most frequently put forward is that a square slot should be cut in the end of the metal handle of the Meccano Special Screwdriver, Part No. 36b. If the handle were altered in this manner it could be used as a "nut key" in positions where the standard spanners could not be handled conveniently. The idea is interesting, but we do not think the increased cost of the Screwdriver would be justified.

Meccano Fun for the Christmas Party

Jolly Toys and Puzzles

THE Christmas season offers a fine opportunity for model-builders to indulge in the lighter kinds of Meccano construction by using their Outfits to make all kinds of mechanical toys and puzzles. Several simple examples of models of this type are described in this article, and these will be found splendid for amusing one's younger brothers and sisters and friends at the Christmas party. All the models dealt with are easy to build, and their constructional details are shown in the accompanying illustrations. Three of them, the walking kangaroo, the "Cum-Bak" and a string puzzle, shown in Figs. 3, 4 and 6 respectively, were described in the Magazine several years ago, but are so interesting that they are repeated for the benefit of present-day Meccano enthusiasts.

The first model, shown in Fig. 1, is a novel toy that was designed by M. LaPipparo, Milan. It is a small "monkey" that can be made to climb vigorously up a piece of cord. The body of the monkey consists of two 3½" Strips joined by Double Brackets at 1 and 2. The bolts that fix the Double Bracket 1 in position hold also the monkey's arms, and the lower Double Bracket is held in position by the 1" Screwed Rod 3. The nuts are left sufficiently loose on the Rod to allow the legs to pivot freely. The legs are made from 2" Strips, with feet consisting of Flat Brackets, and they are connected at 4 by a 1" Screwed Rod lock-nutted in position. The ends of the Spring 5 are looped over the Screwed Rods 3 and 4, and the ¾" Bolt 6 passes through the loop so formed. Two ¾" Bolts are pushed through the Flat Brackets forming the feet and are fitted in place by lock-nuts, one of the Bolts carrying six Washers, which serve as a guide to centralise the cord.

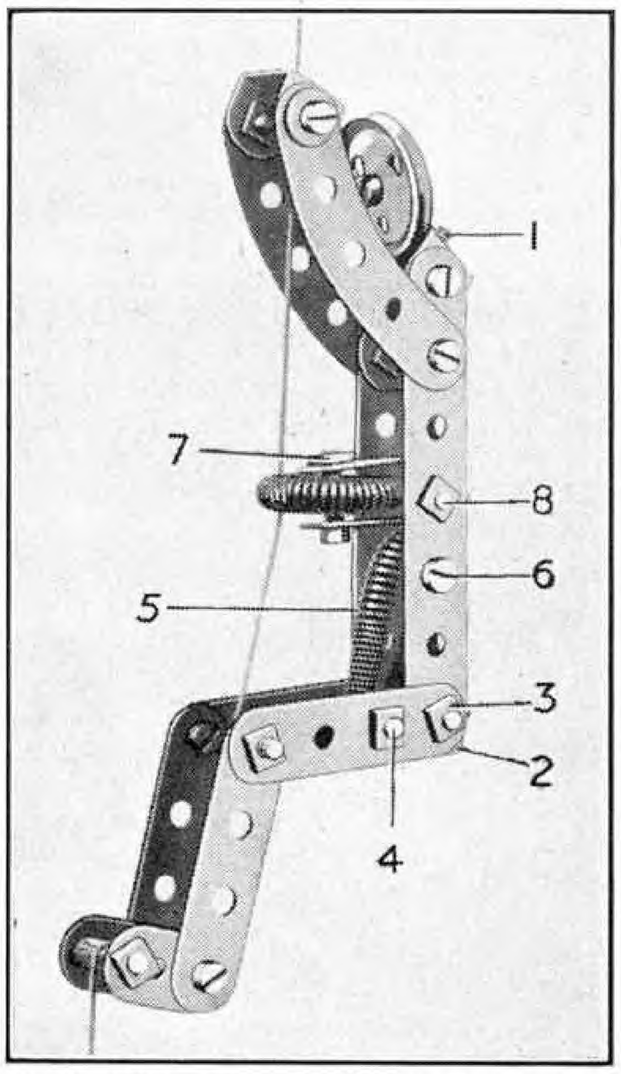


Fig. 1. A Meccano monkey that climbs up a rope.

The back of the body is a 3" Strip, which supports a Cranked Bent Strip. The ½" Bolt 7 carries a ½" loose Pulley around which a Spring is looped, the ends of the Spring being anchored on the ¾" Bolt 8.

The monkey is completed by joining the ends of the arms with a Double Bracket and fitting the head in position. A piece of Meccano Cord is now threaded through the last-mentioned Double Bracket, then around the rearmost ¾" Bolt connecting the feet, and up over the second ¾" Bolt. The Cord is fitted at each end with a 1" Pulley.

To make the monkey climb, the cord is pulled taut, thus causing the legs to straighten and move the body upward and forward. As it does so the Cord is gripped between the coils of the upper Spring. On releasing the tension of the Cord the legs move up under the influence of the lower Spring, and are ready for the next movement.

Parts required to build the Climbing Monkey: 2 of No. 3; 1 of No. 4; 4 of No. 6; 3 of No. 10; 4 of No. 11; 2 of No. 22; 1 of No. 22a; 1 of No. 23; 27 of No. 37a; 10 of No. 37b; 8 of No. 38; 1 of No. 40; 2 of No. 43; 1 of No. 44; 2 of No. 82; 2 of No. 90; 3 of No. 111; 1 of No. 111a; 1 of No. 111c.

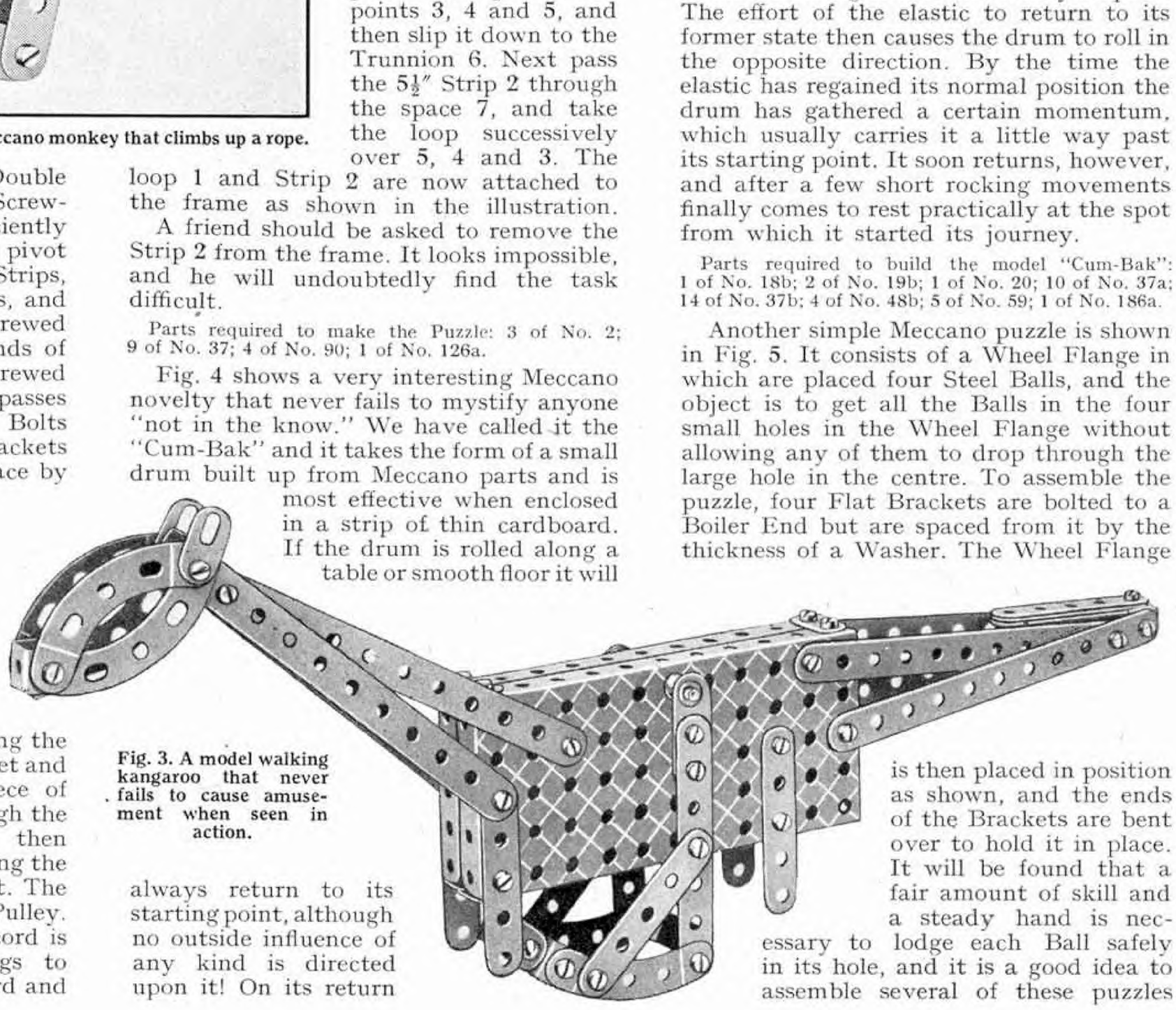
An ingenious puzzle always provides much good fun, and one made entirely from Meccano parts should be particularly popular. Such a puzzle is shown in Fig. 6. It is simple to make, but the problem it provides, which is to remove the Strip 2 from the frame, is by no means easy to solve! Cutting the string or undoing the knot is not allowed.

The loop of string 1 attached to the end of the 5½" Strip 2 should be of such a length as to reach half way along the Strip 2. To assemble the puzzle, first pass the loop over the points 3, 4 and 5, and then slip it down to the Trunnion 6. Next pass the 5½" Strip 2 through the space 7, and take the loop successively over 5, 4 and 3. The loop 1 and Strip 2 are now attached to the frame as shown in the illustration.

A friend should be asked to remove the Strip 2 from the frame. It looks impossible, and he will undoubtedly find the task difficult.

Parts required to make the Puzzle: 3 of No. 2; 9 of No. 37; 4 of No. 90; 1 of No. 126a.

Fig. 4 shows a very interesting Meccano novelty that never fails to mystify anyone "not in the know." We have called it the "Cum-Bak" and it takes the form of a small drum built up from Meccano parts and is most effective when enclosed in a strip of thin cardboard. If the drum is rolled along a table or smooth floor it will always return to its starting point, although no outside influence of any kind is directed upon it! On its return journey it will sometimes overstep its commencing mark, but after a few oscillatory movements it will finally come to rest practically on the spot from which it started. It will only work on a smooth surface.


Fig. 3. A model walking kangaroo that never fails to cause amusement when seen in action.

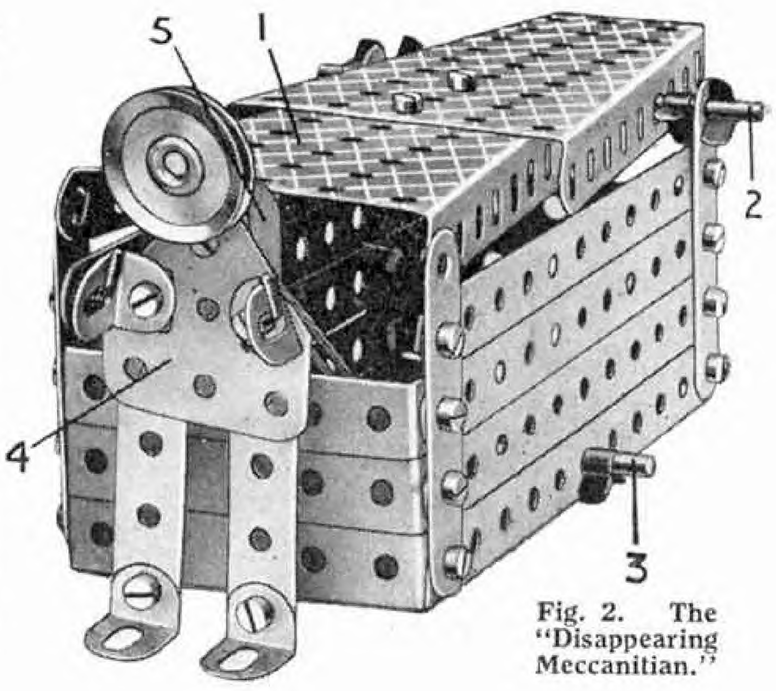


Fig. 2. The "Disappearing Meccanitian."

The mysterious antics of the "Cum-Bak" depend entirely upon a short length of elastic and a suspended weight. The elastic is doubled and secured between the 3" Pulley Wheels, from centre to centre, and a weight, consisting of any suitable Meccano parts, is attached to it in the middle of the drum. The weight illustrated consists of a 1" loose Pulley and two 1" fast Pulleys mounted on a 1" Rod gripped in the bosses of the fast Pulleys.

As the drum rolls along the weight tends to remain in its original position and the elastic therefore becomes twisted. The resistance in the elastic retards the drum to an increasing extent and finally stops it. The effort of the elastic to return to its former state then causes the drum to roll in the opposite direction. By the time the elastic has regained its normal position the drum has gathered a certain momentum, which usually carries it a little way past its starting point. It soon returns, however, and after a few short rocking movements finally comes to rest practically at the spot from which it started its journey.

Parts required to build the model "Cum-Bak": 1 of No. 18b; 2 of No. 19b; 1 of No. 20; 10 of No. 37a; 14 of No. 37b; 4 of No. 48b; 5 of No. 59; 1 of No. 186a.

Another simple Meccano puzzle is shown in Fig. 5. It consists of a Wheel Flange in which are placed four Steel Balls, and the object is to get all the Balls in the four small holes in the Wheel Flange without allowing any of them to drop through the large hole in the centre. To assemble the puzzle, four Flat Brackets are bolted to a Boiler End but are spaced from it by the thickness of a Washer. The Wheel Flange is then placed in position as shown, and the ends of the Brackets are bent over to hold it in place. It will be found that a fair amount of skill and a steady hand is necessary to lodge each Ball safely in its hole, and it is a good idea to assemble several of these puzzles

and pass them around a group of friends. Much amusement will be caused by each one's effort to do the trick first.

Parts required to build the Ball Puzzle: 4 of No. 10; 4 of No. 37a; 4 of No. 37b; 4 of No. 38; 4 of No. 117; 1 of No. 137; 1 of No. 162a.

Another old favourite with Meccano model-builders and one that never fails to cause amusement when seen in action is the "Walking Kangaroo" shown in Fig. 3. If placed on an incline the "kangaroo" will commence to "walk" with a quaint action, and will continue to do so as long as it remains on the downward slope. The secret lies in the construction of the body, and provided the model is built exactly as shown in the illustration the "animal" will perform without any hesitation.

The body of the kangaroo consists of two $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plates connected together by four Flat Brackets, and its neck is constructed from four $5\frac{1}{2}''$ Strips bolted to the Plates as shown. The head is composed of $2\frac{1}{2}''$ Strips spaced at their lower ends only by a Double Bracket. Two Flat Brackets represent the ears. The tail is built up from four further $5\frac{1}{2}''$ Strips joined at their outer ends by a Double Bracket. The positions of the various strips in relation to the body should be reproduced as accurately as possible, for the successful working of the model depends upon them.

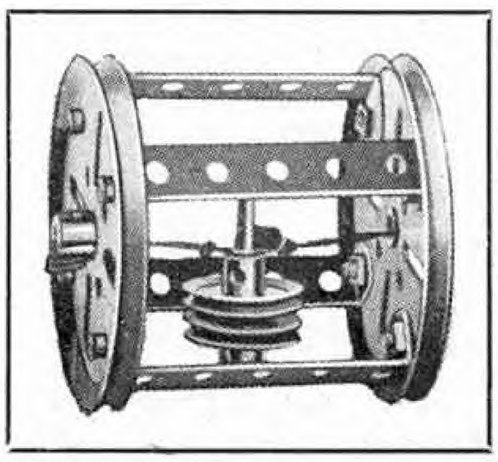


Fig. 4.
The Meccano "Cum-Bak."

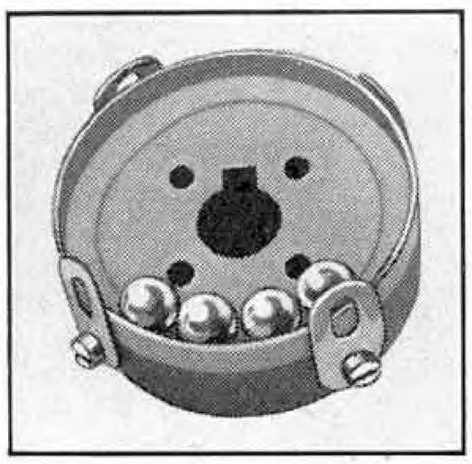


Fig. 5.
An interesting Meccano puzzle.

The body of the animal rocks about a short Rod secured between the rocker frame, which does duty as "legs." This frame consists of two $3\frac{1}{2}''$ Strips bolted at their upper ends to Cranks in which the short Rod is secured and at their lower ends to two $2\frac{1}{2}''$ large radius Curved Strips. These Curved Strips are connected together at their ends by $1\frac{1}{2}''$ Strips bolted to Angle Brackets, and they are braced to the $3\frac{1}{2}''$ Strips by a pair of $2\frac{1}{2}''$ Strips.

Two pairs of $2\frac{1}{2}''$ Strips bolted to the Flanged Plates form stops to limit the movement of the body. When placed on a slope the "kangaroo" swings forward between the Strips and tilts on its front "legs," thereby allowing the rocker frame to swing directly under the model again, when the action is repeated.

Parts required to build the Walking Kangaroo: 8 of No. 2; 2 of No. 3; 11 of No. 5; 2 of No. 6a; 8 of No. 10; 2 of No. 11; 4 of No. 12; 42 of No. 37; 2 of No. 52; 2 of No. 62; 2 of No. 90.

All readers will be familiar with the "Jack-in-the-Box" toy, and an easily built Meccano version of this is shown in Fig. 2. The bottom of the box-like portion of this model consists of a $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate, and three $5\frac{1}{2}''$ Strips bolted to upright $2\frac{1}{2}''$ Strips form each side, with three $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips for the ends. The lid, which is mounted pivotally on an Axle Rod 2, consists of two Sector Plates bolted together, Elastic bands are tied to the sides of these Plates, and are then connected to a Rod 3 passed through the bottom of the box. The Meccanitian also is connected to this Rod by pieces of elastic. When the end of the rear Sector Plate is depressed the lid opens sufficiently to allow the figure to be drawn inside, and then snaps back into place. A Cranked Bent Strip is bolted at the back of the figure and rests against the edge of the Sector Plate.

Parts required to build the model Disappearing Meccanitian: 8 of No. 2; 7 of No. 5; 1 of No. 10; 4 of No. 12; 2 of No. 16; 1 of No. 22a; 24 of No. 37a; 24 of No. 37b; 1 of No. 44; 6 of No. 48a; 2 of No. 54a; 1 of No. 126a.

Our next model, which is shown in Fig. 7, is of a rather different type, as it incorporates a *Magic* Motor by means of which it is set in motion. It comprises a boxer and a punching bag, and when in action the boxer belabours the bag with surprising vigour!

It is best to commence construction with the figure of the boxer. His body consists of two Flat Trunnions bolted together, the lower bolt 1 holding also an Angle Bracket. His legs are formed by a $2\frac{1}{2}''$ Strip and a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip, which are pivotally attached by lock-nutted bolts to Angle Brackets fixed to the Trunnions. One of his arms is a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip and the other is a $2\frac{1}{2}''$ Curved Strip. A $1''$ Pulley fixed to a Flat Bracket forms his head. The figure is fixed to the $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate that forms the base. The Trunnions 2 provide bearings for a $2''$ Rod that carries a Bush Wheel and a $1''$ Pulley. A $2\frac{1}{2}''$ Curved Strip 3 is pivoted by lock-nutted bolts to the Bush Wheel and the $2\frac{1}{2}''$ Strip 4, which is bolted to the Angle Bracket at the back of the boxer.

The *Magic* Motor is bolted to the Flanged Plate as shown, and a small Driving Band connects its driving pulley to the $1''$ Pulley.

The punching bag can be made either from a piece of cloth filled with sawdust, or from a Meccano Loaded Sack (Part No. 122), and is supported by wire from a $2\frac{1}{2}''$ Strip, which is attached by an Angle Bracket to the $5\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plate 5. The latter is reinforced by a vertical $5\frac{1}{2}''$ Strip. The bottom of the sack is connected to the Flanged Plate by a length of elastic.

Parts required to build the model Boxer: 1 of No. 2; 4 of No. 5; 1 of No. 10; 7 of No. 12; 1 of No. 17; 2 of No. 22; 1 of No. 24; 29 of No. 37a; 24 of No. 37b; 2 of No. 38; 2 of No. 48a; 1 of No. 52; 2 of No. 90a; 2 of No. 111c; 2 of No. 126; 2 of No. 126a; 2 of No. 189; 1 *Magic* Motor.

Readers who possess a No. 1, No. 1a or a No. 2 Clockwork Motor can use it as the main feature of an amusing toy horse on wheels. The Motor forms the body of the horse, and to the lower corners of its sideplates the legs and neck are bolted. These are represented by $2\frac{1}{2}''$ Strips, and the front legs are connected by Angle Brackets that carry a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip, through which passes a $3\frac{1}{2}''$ Rod fitted with a $1''$ Pulley at each end.

A single $1''$ Pulley forming the rear wheel is carried on a $2''$ Axle Rod passed through the lower end holes of the $2\frac{1}{2}''$ Strips. The Pulley is driven from a similar Pulley on the motor driving shaft.

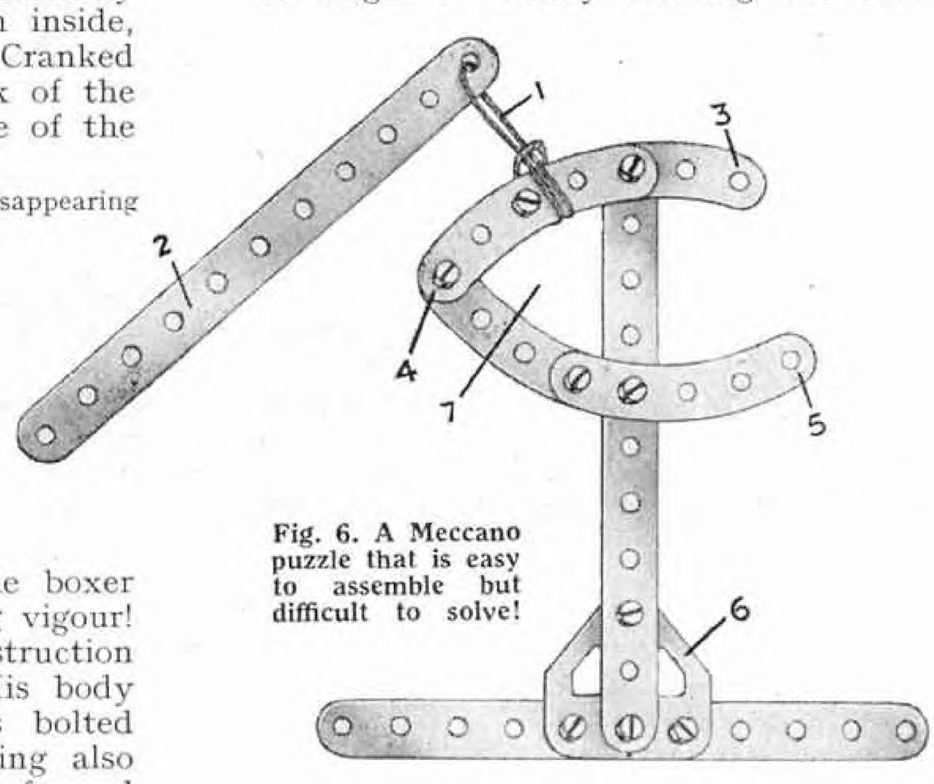


Fig. 6. A Meccano puzzle that is easy to assemble but difficult to solve!

A Trunnion forms the horse's head and is provided with two Flat Brackets for ears. A $2\frac{1}{2}''$ Curved Strip bolted to the brake lever of the Motor forms the animal's tail.

Parts required: 6 of No. 5; 2 of No. 10; 3 of No. 12; 1 of No. 16; 1 of No. 17; 4 of No. 22; 2 of No. 35; 14 of No. 37; 1 of No. 40; 1 of No. 48a; 1 of No. 90a; 2 of No. 126; 1 No. 1 Clockwork Motor.

Another Meccano toy animal that will amuse the younger people at a party is a "Bucking Broncho." This consists of two $5\frac{1}{2}''$ Strips pivotally connected edge to edge by means of a Flat Bracket and bolted through two holes in one end of a $2\frac{1}{2}''$ Curved Strip. This Strip is bolted at its upper end to a $2\frac{1}{2}''$ Strip representing the animal's neck. The horse's body is a $2\frac{1}{2}''$ Strip, and the hind legs are $2\frac{1}{2}''$ Strips joined to the body by a lock-nutted bolt.

The rider consists of a Flat Trunnion and a $2\frac{1}{2}''$ Strip. Two further $2\frac{1}{2}''$ Strips form his legs and two $2\frac{1}{2}''$ Curved Strips his arms, which are lock-nutted to his body and to the horse's neck respectively. By moving the two $5\frac{1}{2}''$ Strips the horse can be made to perform all sorts of tricks.

Parts required to build this model are: 2 of No. 2; 6 of No. 5; 2 of No. 10; 1 of No. 23; 1 of No. 37; 9 of No. 37a; 4 of No. 90a; 1 of No. 111c; 1 of No. 126a.

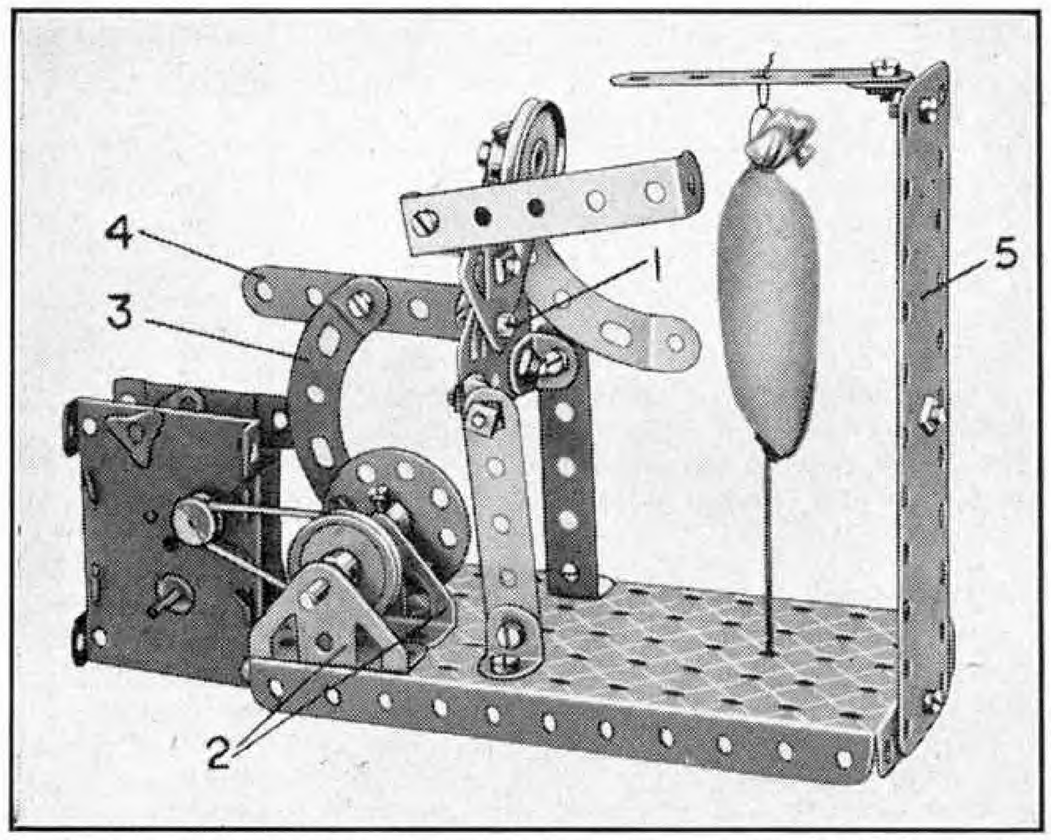
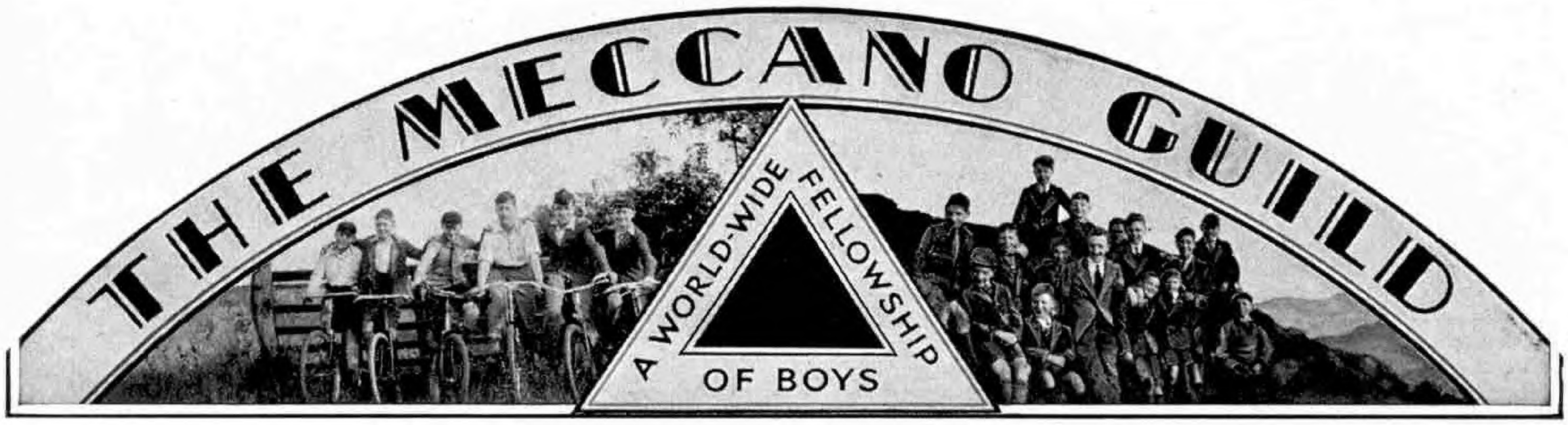


Fig. 7. An amusing model of a boxer in action with a punching bag. It is operated by a "Magic" Motor.



Christmas Greetings

Once again the time has come for me to wish all members of the Guild and of the H.R.C. a merry Christmas. I do so this year in unusual circumstances. The outbreak of war has brought many troubles with it. That is all the more reason for exchanging the heartiest good wishes at such a time as this, however, and so I hope that all Meccano and Hornby Train enthusiasts will have a really jolly time, free from troubles and trials of all kinds, whether they are still meeting in club and Branch life, or are serving in the Army, Navy and the Air Force, in all of which keen Meccano enthusiasts are to be found.

For new members there must be special greetings. This is the happiest time of the year in which to join the Guild or the H.R.C. To begin the great hobbies of Meccano and Hornby Trains, as so many do at this time of the year, is a wonderful thrill, and this is intensified by the fun of Christmas time, especially for those who have joined Meccano clubs or H.R.C. Branches. To newcomers I say therefore: "*Join the Guild or H.R.C., and look out for a convenient club or Branch.*" I will help members to join up with others to get the best out of their common pursuits.

The Clubs in Wartime

I have now received news of proceedings since the outbreak of war in more clubs, and everywhere find the same determination to go ahead, whatever the difficulties. Even the loss of members owing to evacuation and the calls of the Services has not succeeded in bringing the activities of any club to an end. The Leader of one club, the numbers of which have been sadly depleted, writes that he is keeping the club room open, in spite of the fact that at the moment he is the only one attending regularly, in order that his members may have a rallying point whenever they return, even if for a few days only. Another in similar circumstances writes "*Send me more Guild application forms. I must go in search of new members.*" Both these Leaders are showing the right spirit, and it is up to all Meccano boys who are reading this to back up their efforts, and those of all club officials, by joining the nearest club at once. Write to me for details if you are unable to find a suitable club.

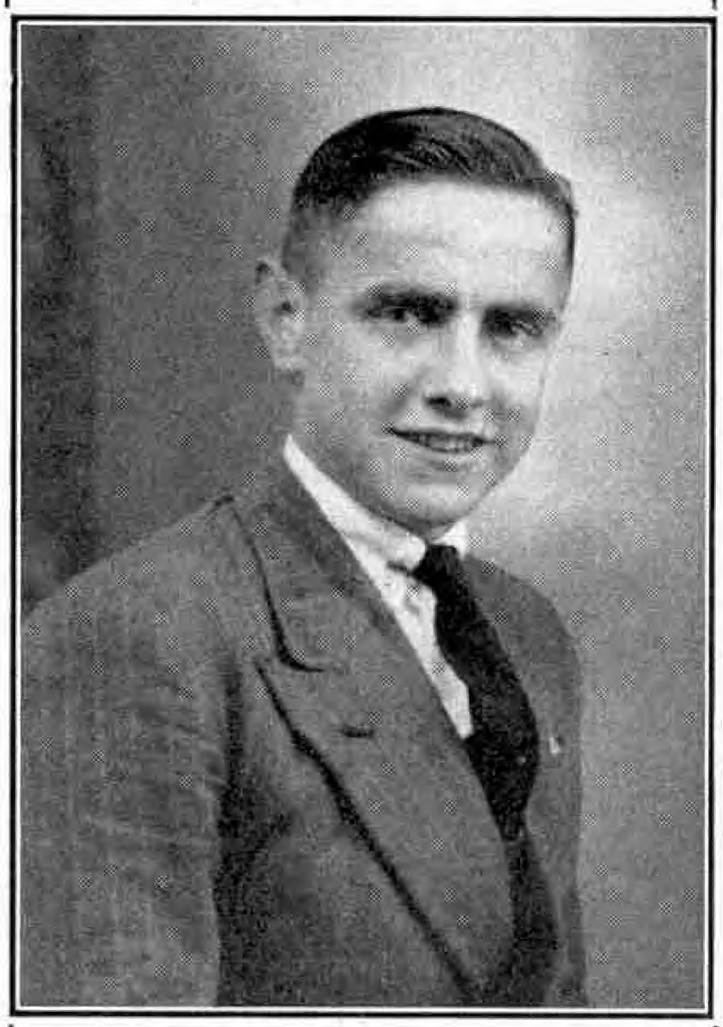
News of Absent Members

All absentees, whether they have been taken out into the country for safety or are older members who have joined the Services, are still members of the Guild and of their clubs. I want to ensure that they are not allowed to feel that they are forgotten. One way in which to ensure this is for those who are left to write to them regularly. A correspondence scheme is not difficult to arrange, and in every club there should be one member responsible for seeing that absentees are kept in touch with club proceedings.

Another fine scheme is to include news of absent members in the club or Branch magazine. The Edinburgh Hobbies Club M.C. have started a special printed newsletter with this in mind. This is published about every two months, and includes news of all members at home and in the forces. The first issue appeared in October, and shows that the club already had a fine war record. The activities of various members are described in a cheery way, and there is no doubt that the newsletter will help to maintain the friendliness between members that is one of the most pleasant characteristics of club life.

Meccano Club Secretaries

No. 51. E. Edworthy



E. Edworthy is the capable secretary of the Exeter M.C. Under the energetic guidance of Mr. M. C. Hodder, Leader, this old-established club is carrying on its usual activities in spite of war difficulties. Model-building continues on a large scale, games are played in the club room, and four football teams are run. The football clubs have earned a splendid reputation for their sportsmanship.

Brighter and Better Programmes

There is just as much enthusiasm in clubs that have not been hard hit by enforced absences. They too have their difficulties, due to the black-out and other restrictions, but they are steadily widening their activities and making sure that their members shall never suffer from lack of some worthwhile occupation. The Hornsea club is a case in point. Mr. Shooter, Leader of the club, has always arranged splendid programmes, but since the beginning of the present Winter Sessions all former records for activity and variety, appear to have been surpassed, as is shown by a glance at the interesting report from this club that appears on the opposite page.

Merit Medallions

All nominations for Merit Medallions for the present Session should be sent in to me as soon as possible. This will give me time in which to have the names of the recipients engraved on the Medallions, and to despatch these in time for presentation at the Social Gatherings or Exhibitions that are held during the Christmas Season.

I want to remind the Leaders that any kind of good work on behalf of a club is a qualification for the award of a Merit Medallion. It may be given for good model-building, or for excellence in some other club pursuit, and members who have done well in recruiting, or have helped in the organisation of the club or have done something to improve the clubroom also are eligible. Useful contributions to the programme can be recognised similarly, and I urge all Leaders to make the greatest use of the awards to show members that their efforts are appreciated.

Proposed Clubs

Attempts are being made to establish Meccano clubs in the following places, and boys interested should communicate with the promoters, whose names and addresses are given below.

BIRMINGHAM—N. Kuster, 92, Richmond Road, South Yardley, Birmingham.

CANADA—R. Gordon, Box 220, Red Deer, Alberta, Canada.

COVENTRY—K. M. Green, 52, Macdonald Road, Stoke, Coventry.

DEREHAM—D. O. Tebbutt, 33, Crown Road, Dereham.

DROYLSDEN—W. James, 36, Beech Avenue, Droylsden, Nr. Manchester.

FLIXTON—M. A. Silverston, "Ardnadam," Irlam Road, Flixton, Nr. Manchester.

HAYES — P. Rumball, 61, Wimborne Avenue, Hayes, Middlesex.

NEW OLLERTON—R. Maddox, 33, Main Road, Boughton, New Ollerton, Notts.

ROTHERFIELD—M. J. Burnford, Dewlands Gate, Rotherfield.



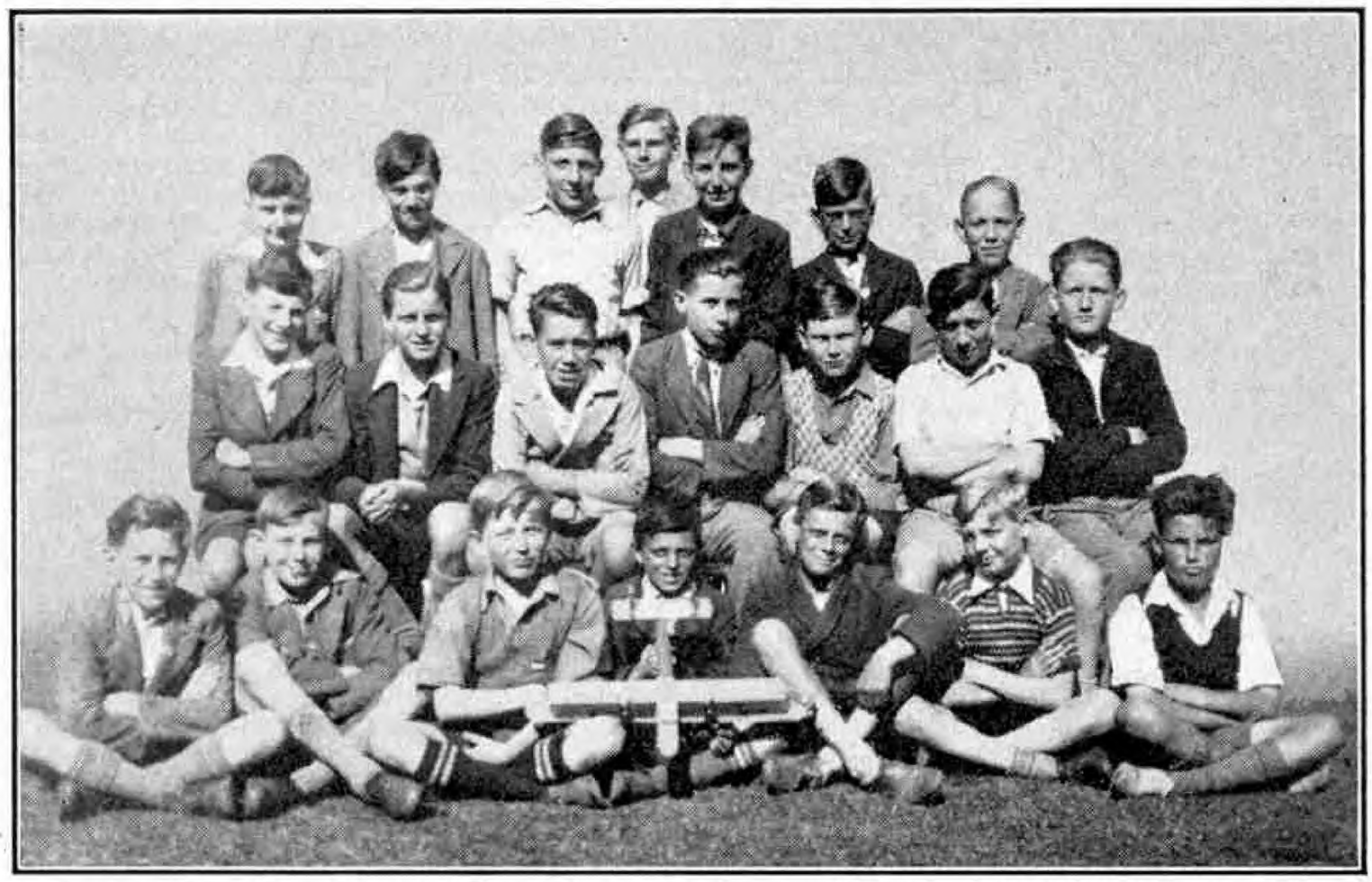
Breich M.C.—Attendances at meetings have been excellent. Members are redecorating the club room. The Woodwork Section is flourishing. Several good Meccano models also are under construction, including a crane that is remarkable for its lifting power. In a novel contest members showed their skill in controlling the crane. Club roll: 9. *Secretary:* M. Anderson, 36, Breich Terrace, West Calder, Midlothian.

Folkestone M.C.—The shed in which the club holds its meetings is being overhauled and repaired. Hornby Railway activity has continued, and a scheme now in contemplation is the making of a new model fishing boat of the sailing type, which is being planned to scale. Club roll: 7. *Secretary:* A. J. Waller, 5, Jesmond Street, Folkestone.

St. Oswalds M.C.—Good attendances are recorded at meetings, although many of the members are now in the country. Correspondence is kept up with the absent ones, who are enjoying themselves considerably. Those left have held Discussions and played Games. Club Roll, 25. *Secretary:* J. F. Jaques, El Molino, 5, Ingram Road, Thornton Heath, Surrey.

Mount Senior School M.C.—Successful Summer Sessions were enjoyed by members of this club, who then set out to make the Winter Sessions the most successful yet experienced. A large increase in membership was aimed at, and ambitious model-building schemes planned. Club roll: 45. *Secretary:* D. Ayto, 18, North Gate, Newark, Notts.

Coloured Mission (Cardiff) M.C.—Very successful meetings are being held, and good model-building has been carried out during the present session. An outstanding model was a giant hammerhead crane driven by two clockwork motors. An interesting pursuit that combines a game with model-building has been introduced. This resembles Contractor's Meetings. The club is divided into sections or "firms," representing various trades. For instance, one business represented is that of the scrap merchant, who buys a large crane or bridge that is to be demolished, breaks it up, and sells the material to a manufacturer or contractor, who builds something else with it. This in turn is sold for demolition. There is a Transport Section that carries all material away when demolition is complete, and business is financed by a Bank Section. This game is remarkably successful, and provides an excellent means of carrying interest from one meeting to another. Club roll: 14. *Secretary:* D. H. Binstead, 37, Penhill Road, Llandaff Fields, Cardiff.



A fine group of members of the Pettit's Senior Boys School (Romford) M.C., Leader, Mr. W. M. Richards, secretary, A. Dawson. This club was affiliated in May of this year, and under Mr. Richard's able guidance progress has been excellent. Model-building is the chief occupation at meetings, and a very successful Exhibition has already been held.

Edinburgh Hobbies Club M.C.—The club made excellent progress up to the outbreak of war, when its members numbered about 250. Many were called up for active service, however, and meetings were suspended because of war difficulties. Members are being kept in touch by the "*Edinburgh Hobbies Club Newsletter*," which gives information about the activities of various members. The position is being re-considered with a view to arranging meetings. Club roll: 250. *Leader:* Mr. C. S. Morrison, 28, Wellington Street, Edinburgh.

Todmorden Road Central School (Burnley) M.C.—This is another club that has not been able to hold meetings, owing to restriction of school hours. Contact with Headquarters is being continued, and new members are being enrolled in the club and the Guild. It is hoped that a start with meetings will be made shortly. Club roll: 12. *Secretary:* J. I. Howarth, 7, Coldran Street, Burnley.

York M.C.—Steady model-building work is being carried on. One model completed was a splendid monoplane driven by an electric motor. Other models in prospect are the blocksetting crane and the dragline. The practice in the club is for members to build large models together, rather than to leave each to construct small models of his own, and all who take part are becoming skilled in design and construction. Club roll: 16. *Secretary:* G. Hodgson, 1, Sunnyside, Heslington Lane, Fulford, York.

Saltash Model Engineering Club.—This club has been hard hit by the war, circumstances making it necessary that the club room should be given up. Meetings therefore came to an end for the time being and the club material was removed. Further developments will be reported from time to time. Club roll: 7. *Secretary:* B. R. J. Braund, 9, Homer Park, Saltash, Cornwall.

Bexleyheath M.C.—So far there have been no meetings since the outbreak of war, the school carrying on with reduced numbers. Arrangements are now being made that will allow regular meetings to be resumed in safe conditions. Members will appreciate the return to active service. Their last great success was the organisation of a Meccano and Hornby Train Exhibit at the school's Open Day. All members worked hard in preparation for this, and the many visitors were greatly attracted by the display. A member of the club who has joined an Air Defence Cadet Unit has written to say how useful he has found knowledge gained at Meccano club meetings. Club roll: 30. *Leader:* Mr. E. Duggan, 9, Pickford Close, Bexleyheath.

Islandmagee M.C.—Since the black-out began some of the younger members have been unable to attend, but apart from this attendance has been excellent. Officials and members alike are determined to keep the club flag flying. Excellent model-building has been carried out, and special interest has been taken in the club's Hornby Railway. The annual Hallowe'en Party was very enjoyable, and the secretary reports that for a time nothing could be heard but the crunching of apples and the cracking of nuts. The club's magazine is to be continued as far as possible. Club roll: 20. *Secretary:* S. McCready, "Hillmount," Islandmagee, Co. Antrim.

Exeter M.C.—Intense activity continues, both in the club room and on the football field. The club is now run by a Wartime Committee, who form a sort of inner cabinet, the Committees of the four football teams being called upon to form the full cabinet. In the club room excellent model-building is carried on, and a special model that aroused keen interest was an excellent roundabout. The Corinthian Football League continues to provide enjoyable evenings, and new games are introduced from time to time. The club's football teams are proving very successful in local league football, and are upholding the reputation of the club for sportsmanship. Club roll: 60. *Secretary:* E. Edworthy, 23, May Street, Exeter.

Hornsea M.C.—Good work continues to be done by all sections of the club. Both Junior Engineers and Apprentices have enjoyed Cinematograph Shows, and films were a feature also of the Social Night of the Senior Engineers. Other interesting programme items have included a Lecture on "*Yorkshire*," given by the secretary to the Senior Engineers, a demonstration of the telephone for Junior Engineers, and a Lecture on "*Cathode Rays and X-rays*," given to the Senior Scientists by A. Tawn. The last of these Lectures was illustrated by experiments on electric discharges through gases. The Woodwork Section is making very fine progress, and several members have done excellent work with small electrical outfits. Successful broadcast evenings are given by "Radio Hornsea," the programmes from the "studio" including news, a puzzle corner and a scientific talk, with records in intervals. Club roll: 17. *Secretary:* P. Richardson, "Summerleigh," Esplanade N., Hornsea.

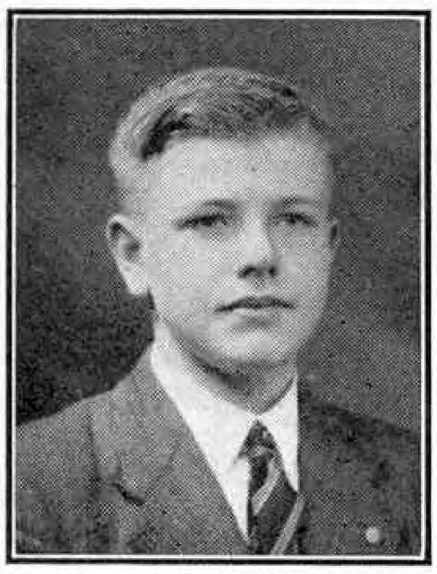
West of England School for the Blind M.C.—This club was formed and secured affiliation to the Guild as a result of the interest taken in it by the Exeter M.C., the Leader and members of which have paid several visits to the School. Unfortunately the present conditions make further visits impossible for the time. Members of the club are keen model-builders and have been doing some excellent constructional work. All are keen and good progress is expected. *Leader:* Mr. Stanley G. Prince, West of England School for the Blind, St. Davids Hill, Exeter.

AUSTRALIA

Maylands (Perth) M.C.—On a special Factions Programme Evening songs were sung, lectures given and plays presented. A Spelling Bee also was held. Rivalry was close, the Red-Blue Faction being awarded 36 points, the Green-Gold 35 points and the Blue-Gold 33 points. Enjoyable visits have been exchanged with the Maylands Scouts. Model-building Contests are being continued, one of special interest calling for racing cars driven by elastic bands. A Blind-fold Model-building Contest also has been held, and in addition many models have been constructed and set in operation. Darts Tournaments have been enjoyed, and other games also have been played. Club roll: 25. *Secretary:* W. Petersen, 1, Warne Street, Maylands, Perth, W. Australia.

MALTA

The Lasallian (Stella Maris College) M.C.—Good progress is being made and membership is increasing. Recent model-building has been devoted to the construction of aeroplanes, which made a fine display when assembled on the club room tables. A model penny-in-the-slot machine for the sale of matches has been constructed. A fretwork outfit has been purchased. A talk on "*Stamps*" was given by the secretary. Football began with a match between "Spanners" and "Screwdrivers," the former winning by a goal. An Exhibition is to be held this month and intensive preparations have been made. Club roll: 25. *Secretary:* A. Caruana, "Floria House," Victory Street, Gzira, Malta.

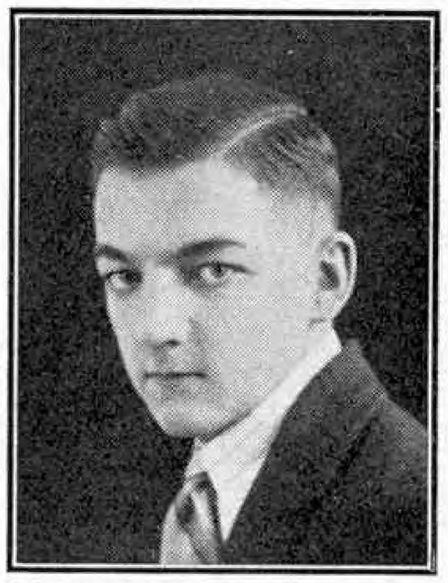


K. Masters, Bletchley, a prize-winner in this contest.

"Engineering of the Past" Contest

By "Spanner"

Further Details of Prize-winning Models



H. Sansome, Nottingham, whose entry also won a good prize.

The full list of prize-winners in the "*Engineering of the Past*" Competition was published in last month's "*M.M.*," together with brief descriptions of a few of the successful models. The space available then, however, did not permit me to describe all the models worthy of mention and I am therefore describing a further selection here.

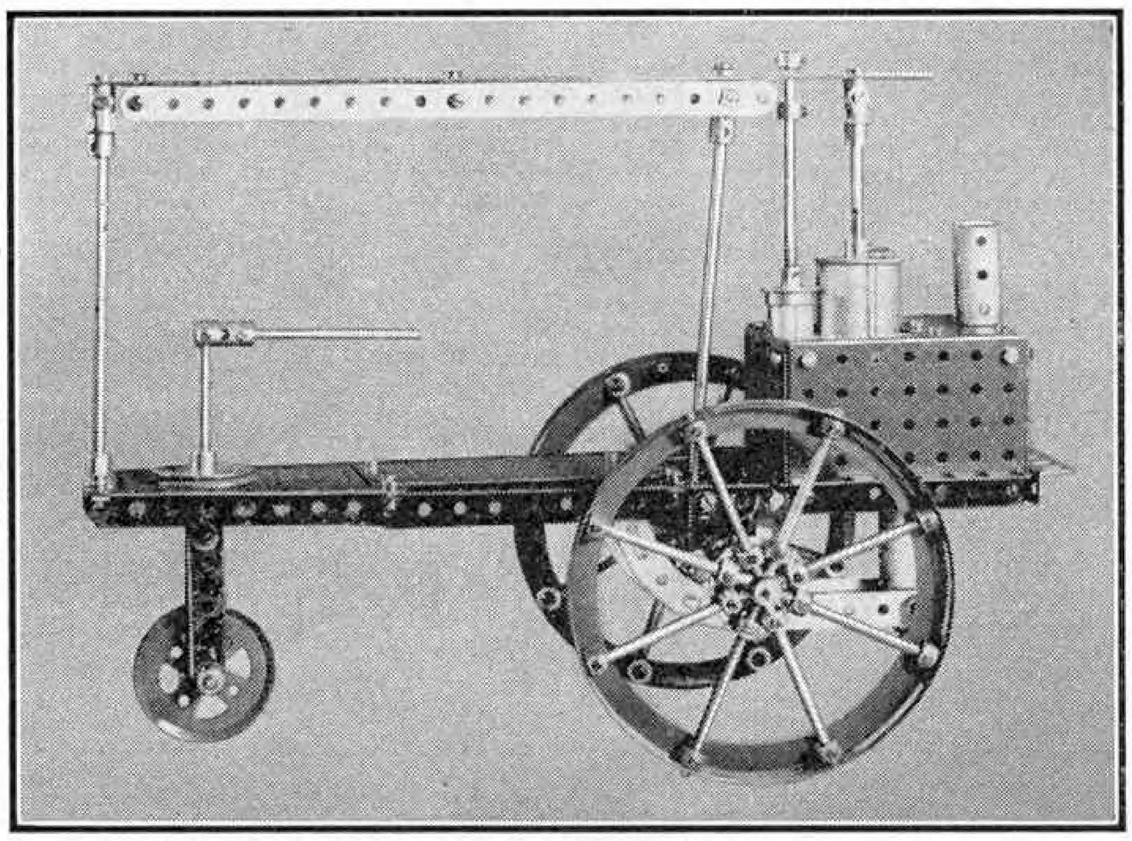
Two of the best models among those awarded the smaller prizes were realistic reproductions of Murdock's steam carriage, which was illustrated on page 625 of last month's "*M.M.*" One of the models is the work of W. Finlayson, Edinburgh, and is shown in the upper illustration on this page, while the other was built by B. Stott, Dundas, Ontario. Murdock's steam carriage was a three wheeled vehicle having a single wheel at the front by which it was steered. The rear wheel axle was in the form of a crankshaft, the crank being connected to a beam that was pivoted at its front end to a vertical pillar, and at its other end to the piston rod. The cylinder and valve chest were built into the boiler unit.

The chassis of Finlayson's model is built up from Angle Girders and is filled in with Plates, and the rear wheels are Circular Girders spoked with Rods. The boiler is formed from $3\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plates, and between these are fixed a $2\frac{1}{2}''$ Cylinder and a Sleeve Piece to form the cylinder and valve chest respectively. Scott's model of this famous old-time vehicle is of more simple construction, but nevertheless incorporates all the main features of the prototype. Artillery Wheels are used to good effect for the driving wheels, and Strips form the beam and connecting rod.

It is interesting to note that W. Finlayson's elder brother Robert also was a prizewinner in this contest, his success being earned with an attractive and sturdy model of a "steeple" engine, of the type that was used in days gone by for operating pumps and other work on land. It differs from the marine type of steeple engine described in last month's "*M.M.*" as it is fitted with a heavy flywheel, and its crankshaft is at the top of the "steeple" with the crosshead guides below. The steeple is built up from Curved Strips and Strips to represent the ironwork of the actual engine, and Plates are used to form the masonry bed and the side wall that supports the end of the crankshaft carrying the flywheel. This side wall also provides a housing for a Clockwork Motor by which the model is driven. The cylinder is a Boiler capped by a Face Plate and Rods form the crosshead guides, piston rod and connecting rod. The model is complete with valve gear, centrifugal governor and pump.

I think model-builders will agree with me if I say that L. Furmedge, Basingstoke, succeeded in getting well away from the beaten track in this competition, for he chose Marconi's first wireless transmitter as the subject of his model! He deserves a medal for his originality! Although the model will not "work" it is very realistic, and the details of its construction are well thought out.

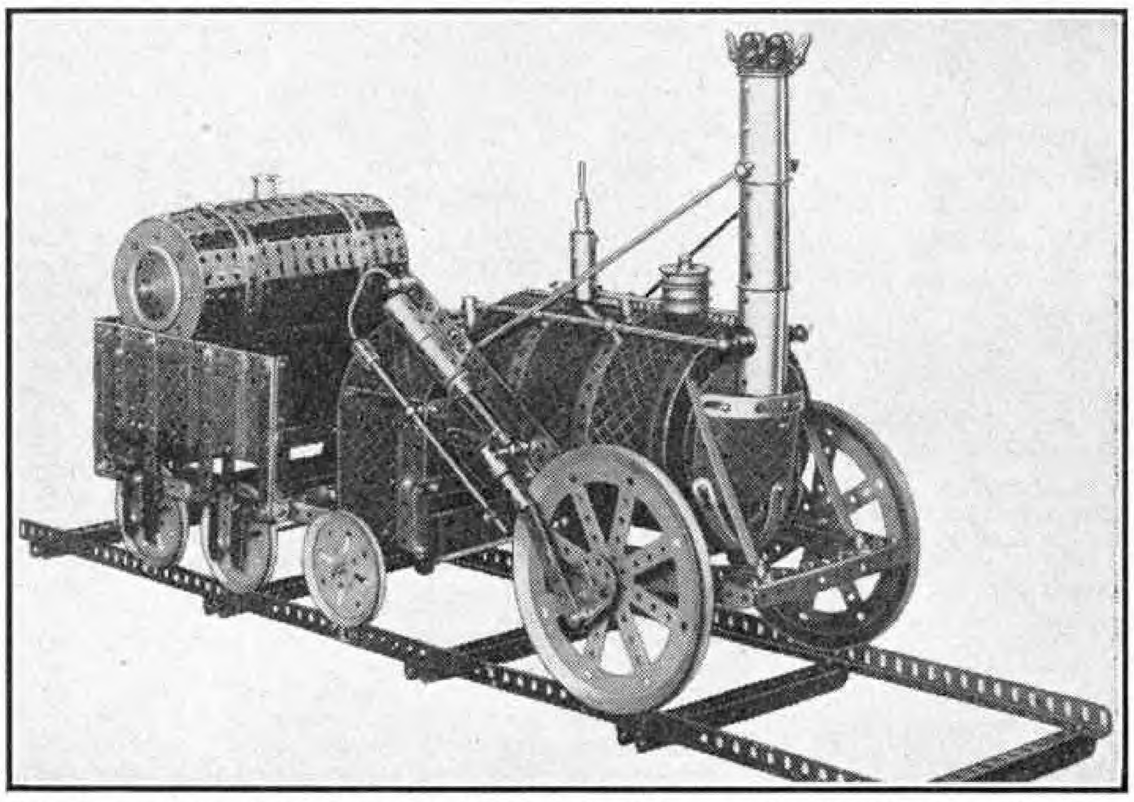
Early types of motor cars were probably the most popular subjects for models with competitors in this contest, and the most outstanding entry of this kind was a scale model of the 60 h.p. Napier car in which S. F. Edge travelled nearly 1,582 miles in 24 hours, in June 1907. The model is the work of K. Pritchard, Brook's Green, and it is so neatly built that one has to study the photograph carefully before realising that it is only a model. This car is a really good subject for a model, as its square-cut lines are easy to reproduce in detail. Pritchard has taken full advantage of this. The model is fitted with an Electric Motor for the power unit, and this drives the rear wheels through a complete transmission system.



A model of Murdock's steam carriage, built by W. Finlayson, Edinburgh.

L. Masters, Bletchley, built a splendid model of "*Lion*," a famous early 0–4–0 locomotive that now forms a showpiece at Lime Street, L.M.S. Station, Liverpool. The main frame of the model is built up from Angle Girders, and the housing is realistically shaped with Flexible Plates of various sizes.

I was rather surprised to find that only a few model-builders had chosen early aeroplanes as their subjects. One of the best models of this type was built by W. Williams, Dover. It represents the monoplane in which Louis Bleriot flew the English Channel in 1909, the first occasion on which the Channel was crossed by an aeroplane. The model is simple, and its chief title to a prize lies in the very close resemblance of its external appearance to that of the actual machine. I hope the additional parts his prize will make available will encourage William to continue his efforts.



This fine model of Stephenson's "Rocket," which was described last month, won Third Prize for J. Matthews, Coventry, in the "Engineering of the Past" competition.

"Sharp Eyes" Contests Nos. 1 and 2

The following competitors in the "Sharp Eyes" Competitions Nos. 1 and 2 submitted the most correct and neat entries and have therefore been awarded prizes as indicated.

"Sharp Eyes" Contest No. 1.

1st Prize, Meccano or Hornby products value £3/3/–: C. Bradshaw, Sheffield 9. 2nd, products value £2/2/–: C. Wrayford, Bovey Tracey. 3rd, products value £1/1/–: M. Brookes, Portsmouth.

Products value 5/–: E. Hooper, Exeter; H. Hussey, St. Helens; E. Tapper, S. Perth, W. Australia; R. Woodrow, Toronto; D. Murison, Buenos Aires.

"Sharp Eyes" Contest No. 2.

1st Prize, Meccano or Hornby products value £3/3/–: C. Bradshaw, Sheffield 9. 2nd, products value £2/2/–: K. Costain, Bolton. 3rd, products value £1/1/–: E. Hooper, Exeter.

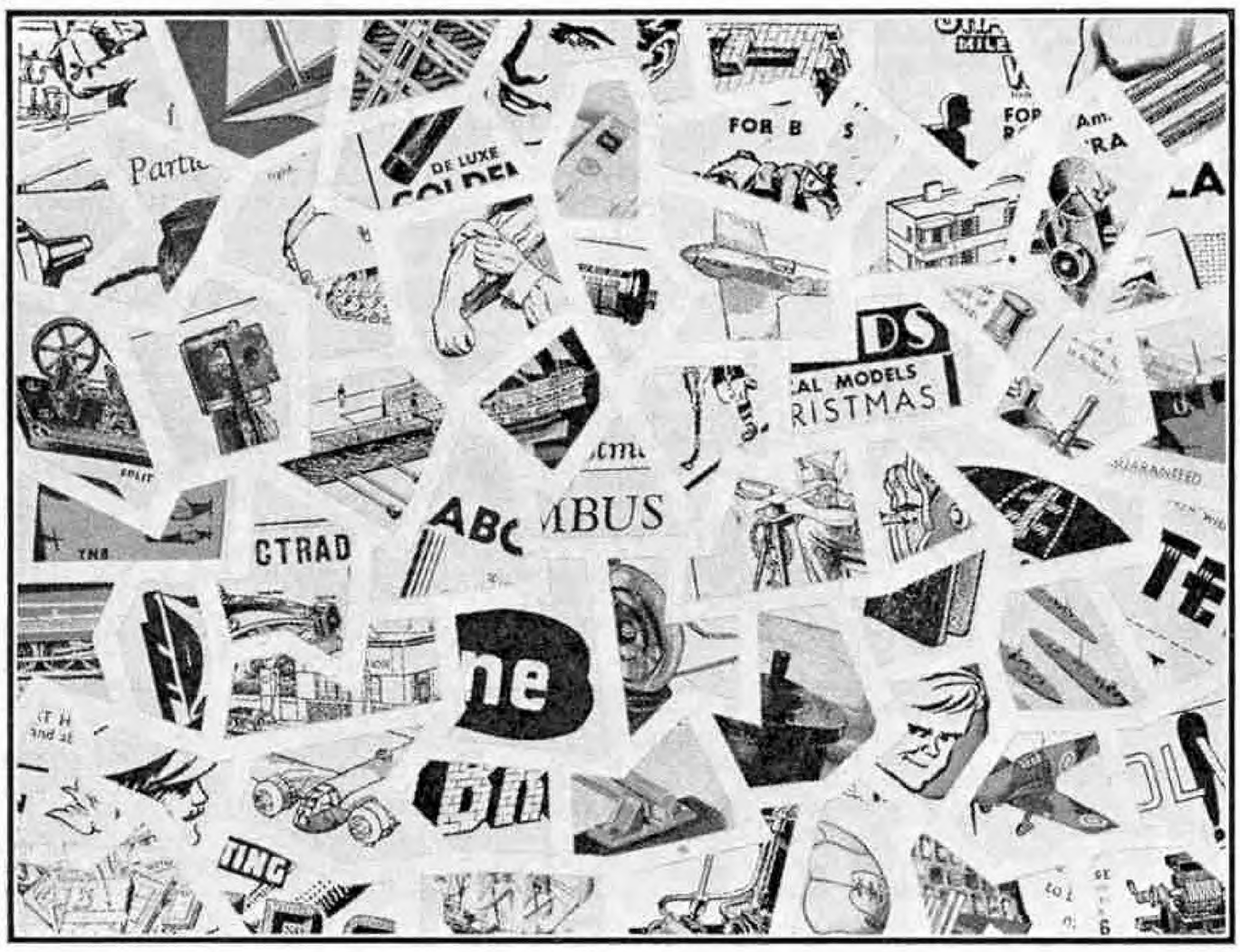
Products value 5/–: H. Gordon Johnston, Southall; D. Roberts, Walsall; C. Wrayford, Bovey Tracey; N. Parker, South Perth, W. Australia; E. Tapper, South Perth, West Australia.

Competition Corner

Advertisement Jig-Saw Puzzle

Our competition this month will give readers the opportunity of showing how keenly observant they are. It takes the form of an Advertisement Jig-Saw Contest. Similar competitions in the past have proved extremely popular, and we have no doubt that every reader will find real interest and amusement in solving the puzzle we are setting them.

The illustration on this page consists of fragments that have been cut from advertisements appearing in this issue, and we want readers to find these advertisements. This will be easy in many cases, but some fragments are teasers that will test the detective ability of the keenest competitor. At the same time the contest is quite fair and straightforward, and with past experience to guide us we have a feeling that our efforts to baffle keen-eyed readers will prove unavailing once again.



In their solutions competitors must give the names of the advertisers concerned, and as certain advertisers are represented more than once in this issue, the page numbers of the advertisements also must be given.

There will be prizes of Meccano Products to the value of 21/–, 15/–, 10/6 and 5/– respectively for the senders of the four most accurate lists in order of merit. In addition there will be a number of consolation prizes. If necessary the neatness of entries and their novelty in form will be taken into consideration in deciding between those that otherwise are of equal merit.

All entries must be addressed to *"Jig-Saw Advertisement Contest,"* Meccano Magazine, Binns Road, Liverpool 13. Those in the Home section must be forwarded to reach this office not later than Monday 18th December. This date is earlier than is usual for our monthly contests, and has been chosen so that we can advise winners by post in time to allow them to choose their prizes for despatch to reach them on Christmas Day. In the Overseas section, in which prizes of equal value will be awarded, the closing date is 30th March 1940. This section is open to readers living outside Great Britain and Northern Ireland, Eire and Channel Islands.

December Drawing Contest

This is the third of our Winter Drawing Contests in which there are no restrictions as to subject, size or treatment. Paintings as well as drawings in pencil or ink are eligible, but prizes will be awarded solely on drawing merit, so that those who for any reason cannot submit coloured entries will be at no disadvantage. Competitors may submit as many entries as they wish, but each can only be awarded one prize in any one contest.

Entries will be divided into the usual two sections, "A" for readers aged 16 and over, and "B" for readers under 16, and prizes of Meccano products to the value of 21/– and 10/6 respectively will be awarded in each section. There will be special sections, with the same age groupings, for Overseas readers, with prizes of the same value as in the Home sections.

The entries in this month's contest must be addressed *"December Drawing Contest, Meccano Magazine, Binns Road, Liverpool 13."* Those submitted in the Home section must arrive not later than 30th December. The Overseas closing date is 30th March 1940.

Christmas Photographic Contest

In these days of highly sensitive films photography is by no means only a summer pursuit. The owner of a camera can find splendid openings for winter pictures outdoors, and indoor photography has been developed to a remarkably high pitch of efficiency. No owner of a camera therefore need be inactive at this time of the year, and to encourage all photographers we are offering handsome prizes in a special Christmas Photographic Competition. Any outdoor photograph of autumn or winter interest is eligible, and indoor pictures of all kinds, including tabletop photographs, also can be submitted in this competition. It is not necessary that the entrant shall have developed and printed his own photographs. This work may be done for him by a professional but he must have made the exposure himself. Competitors should remember that in certain areas photography is forbidden, and make sure that no photographs are taken of camps, aerodromes and fortifications, or generally of a military character.

Entries will be divided into two sections, A for readers aged 16 and over, B for those under 16. Prizes of Meccano products or Photographic materials to the value of 21/– and 10/6 will be awarded in each section. Entries should be addressed *"Christmas Photographic Contest, Meccano Magazine, Binns Road, Liverpool 13."* The closing date in the Home section is 18th December, so that successful competitors will receive their prizes as Christmas gifts, and in the Overseas section the latest date for receiving entries is 30th March 1940.

COMPETITION RESULTS

HOME

October Drawing Contest.—First Prizes: Section A, E. J. Pearce (Portland, Dorset); Section B, C. O. Hatton (Worcester Park). Second Prizes: Section A, N. Dear (Manchester); Section B, M. P. Folhard (Broadstairs). Consolation Prize: D. Bain (Penicuik).

October Sports Voting Contest.—1. H. A. Coleman (Leicester). 2. J. D. Waters (Crowthorne). 3. F. Mills (Kearsley). Consolation Prizes: W. E. Avory (London W.11); N. Forrester (Scarborough).

OVERSEAS

July Photo Contest.—First Prizes: Section A, L. W. Humm (Geraldine, N.Z.); Section B, C. O. Ekwensi (Ibadan, W. Africa). Second Prizes: Section A, J. S. de' Conti Manduca (Sliema, Malta); Section B, K. R. Cassells (Wellington, N.Z.). Consolation Prizes: R. Myburgh (Claremont, S. Africa); T. Wade (Johannesburg).

XMAS

YOU must get this **FREE XMAS GIFT;** its mostly new issues; pictorials and commemoratives; it's simply too good to miss **AND** it is **ABSOLUTELY FREE.** It includes famous Christmas Charity issues of **HOLLAND** (Rembrandt's "Laughing Boy") and **SWITZERLAND** (the famous children's Pro Juventute) as well as **JAPANESE** New Year's Greetings Stamp. Also included is the new **NORTH RHODESIA** pictorial depicting Elephant and Giraffe; **ITALIAN SOMALILAND** (Lighthouse); **CANADA** (1932 Ottawa Conference); a set of 4 large **MOROCCO** (Sultan's Palace, Tangier and Agadir); **HUNGARY** (Stephen); new **SOUTH RHODESIA** (our Admiral King); new **STRAITS** issues from **PERAK** (Sultan Iskandar); **SELANGOR** (Mosque) and **JOHORE** (Sultan Sir Ibrahim); high-valued **BELGIUM** (Ancient Engine); pictorial **GUATEMALA; FINLAND** (Suomi); **I.F.S.** (American Constitution); new **NIGERIA** and **INDIA;** obsolete **SINGHALESE** issue and finally **ITALY** (Mussolini). Just send us 2d. stamps and get this gift **ABSOLUTELY FREE** together with an approval selection. **WINDSOR STAMP CO. (Dept. M), Upper Dicker, Hailsham, Sussex.**

ROYAL CANADIAN VISIT PACKET FREE!



If you are a stamp collector or intend to start collecting you should send for this wonderful packet of 31 varieties. It includes the set of stamps featuring our King and Queen and War Memorial at Ottawa, issued to commemorate the historic royal visit to the American Continent. You will be proud to own this set, and for this month it is free to "Meccano Magazine" readers. Also included are stamps from Malta, Ceylon (new K.G. issue), India, set of Italian, New South Wales (old Q.V.). Don't delay as supplies are very limited. Just send 2d. for postage and request our famous approvals (known all the world over for over a quarter of a century).

LISBURN & TOWNSEND LTD. (Dept. M.M.), LIVERPOOL 3.

Shopkeepers: We are sole makers of the "Liver" shop packets. Ask for particulars.



FREE Wonderful 1939 Offer 20 New Issues and Novelties

Including new **BELGIAN CONGO, CAYMAN ISLANDS** (King George VI), **CEYLON** (pictorial), **KENYA** (King George VI), **MONACO** (new design), Set of DENMARK, SPAIN, **STRAITS SETTLEMENTS** (King George VI), TURKEY, etc. I will send this collection **absolutely free** to all stamp collectors **sending 2d. postage (abroad 6d.)**

G. P. KEEF, WILLINGDON, EASTBOURNE, ENGLAND.



THE TRI-AIR PACKET contains 40 fine stamps, the majority **TRIANGULARS and AIRPOST.** at double the cost of the packet: **HOLLAND** (triangle). **ECUADOR** air, a huge stamp printed in four colours. **COSTA RICA** triangular (fish) and 2 **12 HUNGARY** pictorials including airpost. **U.S.A.** (wings). **3 PALESTINE** (pictorials). Set of issue air. **6 BRAZIL** airpost and aeroplane design. **4 new FRENCH COLONIALS. COSTA** new issue (two queens). **Price 4½d.** Postage 2d. Abroad 3d. extra. Purchasers of above asking for approvals receive set of **10 PERSIA FREE** or another triangular stamp different from those in packet. In addition senders of addresses of stamp-collecting friends receive **6 POLAND FREE.** **Bargains:** 1,000 varieties, 3/11. 100 British Colonials, 1/-. 18 Georgia, 10d.



The triangulars alone are usually sold **2 TANGANYIKA** George VI pictorials, other exhibition triangulars. Set of **5 ROUMANIA** (airpost). **2 GERMAN** 1st **RICA** large air. **GREEK** (map), air and



H. C. WATKINS (M.M. Dept.), Stamp Importer, **GRANVILLE RD., BARNET**



10 BRIT. EMPIRE COMMEMORATIVES

To all approval sheet applicants sending 2d postage we offer this amazing packet including scarce Australian, Newfoundland 1911 Coronation, Eire Constitution, Jamaica and other interesting Pictorial stamps, also our list of sets and special bargain offers. Offer is for 30 days, abroad 60 days.

Dept. 324. ERRINGTON & MARTIN. South Hackney. London E.9. Established 1880.

100 DIFFERENT STAMPS FREE to applicants for ½d. approvals. Cox, 17, Stoneleigh Park Road, Ewell.

Bargain Approvals! Fine Collection Builders. Enclose postage for free gift. J. Turner, 3, Grenville Place, Southgate, Barnsley.

THE FIRST STAMP EVER ISSUED

(British 1840 Penny Black) for P.O. **4/6!** It is guaranteed genuine in every respect. Its companion stamp (1840 2d. blue) for a further **6/9** (cat. 17/6)! Other "Classics" which every collector should have are the **Cape of Good Hope Triangulars;** we offer 1d. rose (cat. 40/-) for **12/6;** 4d. blue (cat. 15/-) for **5/-;** and 6d. pale lilac (cat. 40/-) at **15/-.** Superb approvals of any country against approved English References or a deposit. **Full Lists Free. NORRIS & CO. (Dept. M), Somercotes, Derbyshire.**

BRITISH COLONIALS

King George VI and other modern issues. Also fine selection of foreign picture stamps. Low prices and generous discounts.

Send 1½d. stamp for 10-page approval book.

J. P. WHITMORE, P.T.S., 15, WALLBRIDGE, FROME, SOMERSET.

THOUSANDS

of satisfied customers all over the world during the last 18 years have expressed satisfaction with the **"DIAMOND" PACKET,** which contains approximately **1,000 UNSORTED STAMPS** from Convents abroad. **1 pkt. 1/6, 3 pkts. 3/9, 5 pkts. 6/-.** All post free inland. (Abroad 1/- per pkt. extra.) **BEWARE OF IMITATIONS.** Send for free price list of sets and packets.

O. NERUSH (Dept. A), 68, Turnpike Lane, London N.8.

FREE! COMPLETE SET ROYAL VISIT TO CANADA—

on issue for **A LIMITED PERIOD ONLY AND NOW SCARCE,** together with other **COLONIAL COMMEMORATIVES, LARGE K.G.VI PICTORIALS,** set of **5 AIRMAIL,** set of **4 LARGE KING CAROL OF ROUMANIA, SIAM. LATEST ISSUES** from **GREENLAND, BOLIVIA, ABYSSINIA, RUANDA, GREECE** (Large Charity), etc., etc. **IN ALL**

35 STAMPS CATALOGUED 13/- FREE

to every **GENUINE** applicant enclosing 2d. (abroad 9d.) for my WORLD-FAMOUS **"VALUE"** APPROVALS, containing only perfect stamps at **SUCH LOW PRICES** which enable you to buy TWO stamps instead of one.

PHILIP COCKRILL, 13, MONTRELL ROAD, STREATHAM HILL, LONDON S.W.2.

INTRODUCING my brand new range of Colonial and Foreign sheets—all a blaze of colour! Stamps at ½d. and 1d. each. All the commonest eliminated. Value has to be seen to be believed.

CAMPBELL, HALDON AVENUE, TEIGNMOUTH.

A Real Pleasure to look through our Approvals. ½d. each or 30 for 1/-.

E. & N. GREY, 9, ROSEMARY AVENUE, HOUNSLOW.

THE WONDER PACKET

50 different stamps, including 24 Great Britain from 1854. British Colonials, French Colonials, etc. Free to applicants for my famous ½d. stamps and cheap sets. Without approvals 9d.

S. H. FLEMING, 52, WHITCHURCH ROAD, CHESTER.

HOSPITAL STAMPS

75 Different Foreign and Colonial Stamps selected from Collections presented to Hospital. Send 6d. and addressed envelope to:

SECRETARY, Memorial Hospital Hall, Woolwich, LONDON S.E.18.

An approval sheet from our limited number will be sent on request.

TWIN PROBLEMS

BIRTHDAY AND XMAS PRESENTS

• SOLVED! •

FREE GIFTS OF STAMPS—FREE

REQUEST APPROVALS FROM OUR QUALITY APPROVAL SERVICE

A. & R. APPLEBY, 443, CANNOCK RD., BIRMINGHAM

65 DIFFERENT STAMPS 65

To all genuine approval applicants who request selections of British Colonials, priced from ½d. each, less 3d. in the 1/- discount, I am presenting free of charge 65 different stamps including many old and new issues of the British Colonies. Sent POST FREE.

ERIC J. WATTS, 184, Northampton Road, Wellingborough.

30 DIFF. STAMPS FREE to approval applicants. R. Smith, Highworth Road, Faringdon, Berks.

K.G.VI COLONIALS, 50 diff., 2/-. 100 French Cols., 1/-. E. J. Barrett, 70, Lyndhurst Gardens, Finchley, N.3.

Postcard brings a fine selection on approval, priced from ½d. G. Croft, 9, Hanover St., Kildwick, Keighley.

SET Seychelles Coronation on F.D. Cover, 3d. with Bargain Apps. Dawes, 64, Colonial Av., Whitton, Mdx.

FREE! Crete Set (cat. 1/8). To approval applicants, 1½d. stamp. Griffin, 93, Colindeep Lane, Hendon, N.W.9.

500 WORLD-WIDE STAMPS ... ... 9d.
100 DIFFERENT BRITISH COLONIALS ... 1/-
5/- BRITISH COLONIAL or **SCARCE OLD BORNEO FREE** to **GENUINE APPROVAL APPLICANTS** enclosing 2d. postage.

WAY, MARPLE, CHESHIRE.



COMPLETE SET
3 VALUES
commemorating
the ROYAL VISIT TO CANADA
FOR POSTAGE 2d.

SPECIAL OFFERS!

500 DIFFERENT STAMPS 2/6;
1,000 at **5/-; 2,000** at **15/-; 3,000** at **40/-.**
30 CANADA 1/-.
50 GREAT BRITAIN 1/6.
100 BRITISH EMPIRE 2/-; 200 at **4/6.**
12 U.S.A. COMMEMORATIVES 1/-.
15 ABYSSINIA 2/6.
50 CZECHOSLOVAKIA 9d.
50 GREECE 1/-.
Stamp Albums at **2/-, 2/6, 3/6, 5/-, 7/-, 9/-, 16/6, 21/-, etc.**

Write for full illustrated Price Lists gratis.

J. SANDERS (Dept. M) 3, Commercial Road, SOUTHAMPTON, ENGLAND.

STAMP COLLECTING

A Stamp History of the War

ONE of the greatest attractions of stamp collecting as a hobby is the way in which it can be made to tell the story of some event, or even of a nation. For instance, stamps may be used to trace the origin and history of the present war. Now is the time to start a collection for this



purpose, and in this article we shall see how to set about this occupation.

Our stamp story can most conveniently start with the rise of the Nazi party to power in Germany. The first illustration therefore should be the German issue commemorating the opening of the Reichstag on 12th April 1933. This was noteworthy for the first appearance on a stamp of the Nazi swastika. This emblem was used as the watermark of the stamps, with a portrait of Frederick the Great for the design. How often recently it has been commented that the Führer has imagined himself as a second Frederick! The stamp seems to prove the point.

The next stage of the story, the determination of the Nazis to secure world domination, can be traced with the aid of the January 1934 air stamp. This showed a German eagle with outspread wings covering a terrestrial globe. Strangely enough the swastika is partially eclipsed by the globe, the only parts of the world remaining visible being North and South America.



Next comes the August 1934 issue, commemorating the Saar plebiscite. Incidentally, the opening phase of the war on the western front can be touched upon by illustrations drawn from the issues of the Saar Valley. There are many excellent stamp pictures of the industrial life of this rich territory. Thus the 25 pf. value from the 1921 issue shows river traffic in Saarbrücken itself, and the Nazi success in the Saar plebiscite is celebrated on the January 1935 issue, which shows an allegorical design of a child rushing into her mother's arms. The stamp chosen for our illustration and reproduced on this page shows the airport at Saarbrücken.

The first portrait of Hitler appears on a 1937 stamp issued to celebrate his 48th birthday, but there is a better one on the birthday issue of 1938. Another German stamp that must be included is the Hitler Youth issue of January 1938, the fifth anniversary of the Nazi rise to power. This stamp will serve to refer to the hold that the Führer exercises on the youth of Germany. There are many other German stamps that can usefully be included in our stamp history, and the number need be subject only to the individual collector's discretion as to the detail that is to be included.

The next important development in the coming of the war was the seizure of Austria, which is commonly referred to as the "anschluss," this German word meaning simply union. A stamp was issued to commemorate the plebiscite by which this was accomplished. The date of the issue was 8th April 1938, and the design shows an Austrian and a German marching with arms around each other's shoulders and supporting between them the Nazi flag.

As our illustration of this part of the story we have chosen a stamp bearing a portrait of Dollfuss, Chancellor of Austria from 1932 to 1934. It is the 24 gr. value issued as a mourning stamp in October 1934. A second stamp bearing a portrait of the assassinated Chancellor appeared in 1936. Other useful contributions to the Austrian part of the story can be found in the many illustrations of beauty spots with which the country's issues abound. There are many views of Vienna, the capital, and the River Danube is shown on the August 1935 issue. Various illustrations of Austrian national culture are found in issues celebrating the country's musicians, artists, writers and painters which have been referred to from time to time in these pages. All of them seem to speak of the country's desire to be allowed to live in peace.

The next victim of Nazi oppression was Czechoslovakia. It will be remembered that this country was formed from certain of the former Austrian states at the end of the 1914-18 war. The first stamps of Czechoslovakia actually were issued by revolutionaries in October 1918, and Boy Scouts were employed in the distribution of the mails. Those early stamps were later overprinted with the name of the Czech patriot Masaryk, the first President, and are very rare in that form.



The first portrait of President Masaryk appeared on a 1920 issue, and there are no less than 10 portraits of him available on Czechoslovakian stamps. The portrait of President Benes, who held office at the time of the German invasion and is now in London, is to be found on the May 1936 issue, illustrated on this page.

Czech legionaries are fighting for the independence of the country from which they are exiled. There were Czech legions in the war of 1914-18 also, and two designs showing these legionaries are available



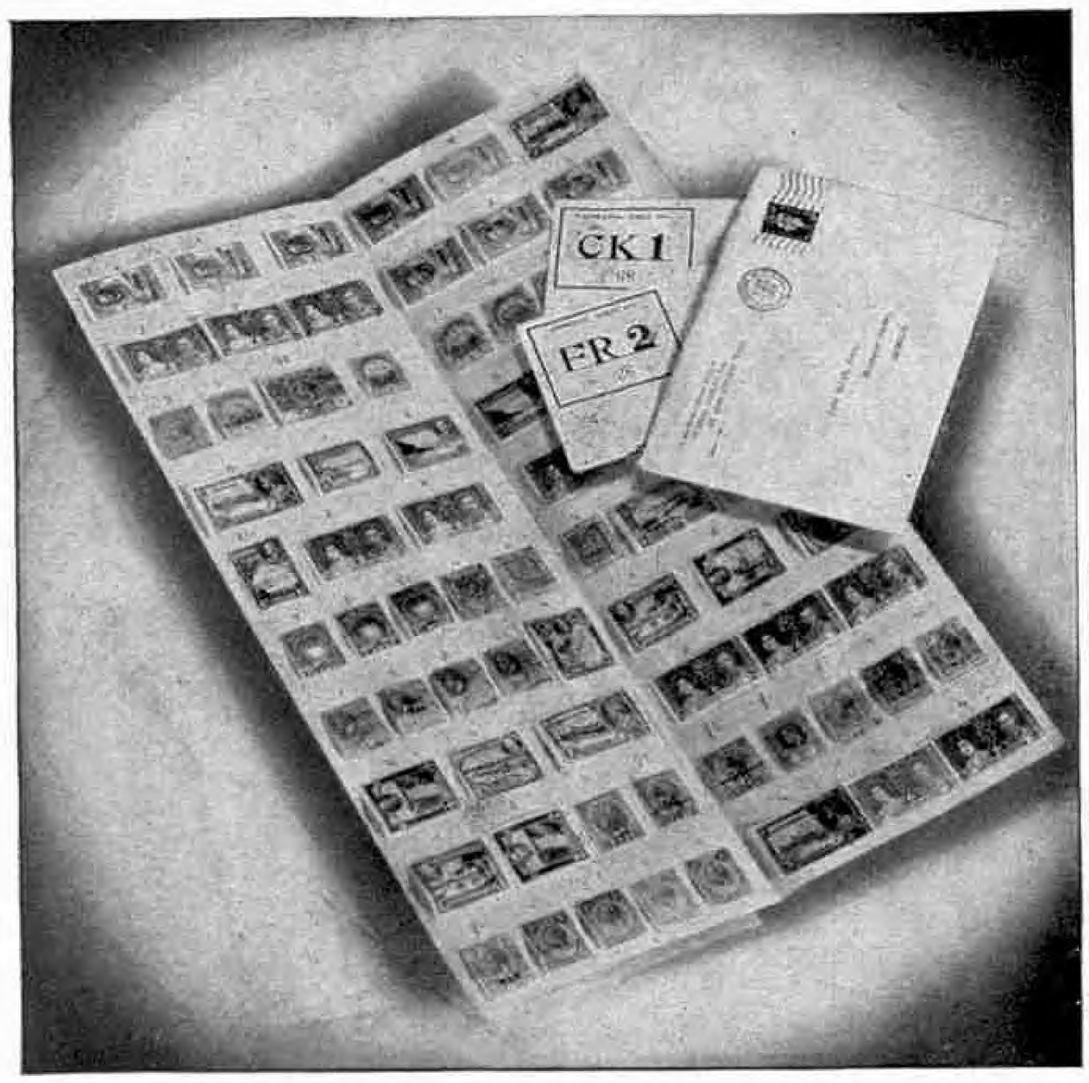
for our collection. The first appeared on the issue of June 1937, which marked the 20th anniversary of the battle of Zborov. The other appeared in March 1938 to commemorate the part played by the legions in battles in France, Italy and Russia in 1918.

The stamps issued by Germany to mark the "conquest" of Czechoslovakia and those issued for use in the so-called protectorates of Bohemia and Moravia also should be included in our collection, but specimens of these may not be easy to acquire. Small supplies had reached Britain before the declaration of war, but since then it has been impossible to import them and stamp illustrations of this part of the story may have to wait a while.

The scene of operations switched next to Memel and Danzig on the Baltic, and specimen stamps from these States must be included. The first appearance of Danzig in the stamp world came on 21st June 1923, when stamps of the old Imperial German States were overprinted "Danzig" and issued for use in the Free City. The first definitive stamps, bearing the device of an armed merchant ship, appeared at the end of January 1921. Since then upwards of 300 stamps have been issued by Danzig. Of these we have chosen for illustration one of a set issued in January of this year to celebrate the 125th anniversary of the first Prussian annexation. The set includes various historical designs, and the one reproduced here carries an allegorical representation of the union.

The war between Poland and Germany was preceded by a "postal war," started on the German side by the sudden adoption of the practice of addressing letters for Poland in their old German form. Thus Lwow became Lemberg, Poznau became Posen, and so on. This calculated insult was a breach of international postal practice, which requires the use of official place names except in cases where such names have universally recognised equivalents, such as Munich for München, or Aix-la-Chapelle for Aachen. (Continued on page 717)

For YOU this Christmas . .



. . STANLEY GIBBONS' APPROVALS

More essential than ever to all keen collectors this Christmas. Wherever you may be, at home or away in the country, we can send them to you by post. They are the best in the world, and, if you want a fine collection, be sure to get your stamps from a Stanley Gibbons' Approval Sheet.

Remember, each sheet contains many stamps at only a penny or a few pence each. The sheets are arranged in catalogue order so that you can ask to see the countries in which you are particularly interested.

Every keen collector should make a point of seeing a Stanley Gibbons' Approval Sheet this Christmas.

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A brand-new 1940 Stamp Catalogue. There may be "black-out" evenings, but that's no reason for you to collect stamps "in the dark," without the important information and help that only an up-to-date Gibbons' Catalogue can give.



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A new stamp album is a fine Christmas present. To get the best (and you will pay no more) make certain it's a "Stanley Gibbons." There are S.G. Albums at prices from 6d. upwards—one of which is sure to be just right for **your** collection.

We specially recommend:
Printed Albums—STRAND (5/–, 6/6 and 7/6), VICEROY (8/6 and 10/–), and CENTURION (12/6 and 15/–).
Blank Loose-Leaf Albums—SIMPLEX (4/6 to 12/6), ACE (4/–), SENATOR (6/6), EXETER (8/6), and UTILE (8/6 to 20/–).

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To help you choose the best Xmas Stamp Collecting Gifts, write NOW for our FREE 108-page lists of Stamp Albums, Wonderful Stamp Bargains, Catalogues, etc., etc.

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WONDERFUL VALUE! Money returned if not satisfied. Contains 2 LETTLAND, 2 ESTHONIA, 2 POLAND (Gen. Ben & Field-Marshal Pilsudsky), Set 4 FINLAND, LITHUANIA, Set 5 SOVIET RUSSIA (unused, etc.), UKRAINE, 2 DANZIG (bi-coloured), Set 6 GERMANY (Air Post, Hindenburg, officials, etc.), 2 FRENCH (large pictorial and exhibition), Set of 3 GEORGIA (South Russia), including high value pictorial. **PRICE 3d. only.** Postage 2d. (abroad 3d. extra). All asking to see my approval sheets will be presented with a UNIQUE Set of **10 POLAND** (Soldiers, Commemoratives, Official, View and Pictorials) usually sold at 10d.

H. C. WATKINS (M. DEPT.), GRANVILLE ROAD, BARNET.

100 FREE GIFTS (Your own choice)

To collectors applying for our **famous approvals (new series)** as under and sending 1½d. postage, will receive a list of **100 different gifts** (sets, packets, and single stamps) from which **any one** may be chosen, and if not less than 2/6 is purchased from the sheets a further gift can be chosen. **"Reliant"** series of **British Colonial** approval sheets. A1, 1d. to 3d. each, A2, 3d. to 6d. each, A3, 8d. to 2/- each. Also our **"RED" books of SETS.**

Harry Burgess & Co. (Dept. M.M.), Pembury, Kent.

Bargain Discount Approvals

from a firm who take a personal interest in all clients. We offer you a first-class approval service of picked stamps at 1d.–6d. each (less a generous discount) including the latest George VI issues, used, and numerous other recent issues. We never send a further selection unless requested and never worry you to buy. Spend as little or as much as you like. Approvals or full details are sent post free on receipt of a post card.

THE BIRKDALE STAMP COMPANY, P.T.S.
(Dept. M), 104, LIVERPOOL ROAD, SOUTHPORT, LANCS.

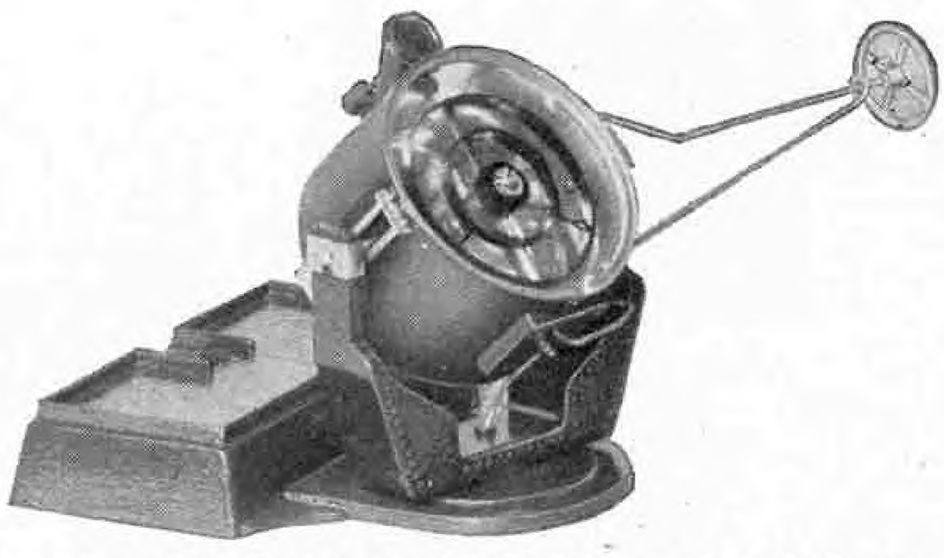
WAR COLLECTION FREE!

You will be proud to own this fine collection of Pictorial Poland, Czechoslovakia, German Pictorials, Saar Stamp, and George VI Colonials from Ceylon, Cayman, N.Z., Canada, etc. This wonderful collection of 50 is entirely FREE to those requesting approvals and sending 2d. postage.

XMAS BARGAINS. 1,000 unpicked stamps from Missions, Convents ... **1/3**
500 British Colonials **2/-**
500 All Different World ... ... **2/-** 1,000 All Different World ... **4/6**
Post Free Inland.

PRICE & CO., Stamp Industries, MOLLINGTON, CHES.

BRITISH MADE **ASTRA** TOYS OF QUALITY



AN EXCLUSIVE RANGE

of Beautifully Constructed WORKING MODELS

Obtainable at all Good Stores and Toy Shops

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Telephone: Shepherd's Bush 2472

^ Stamp History of the War—

(*Continued from page 715*)

The "war" developed to the extent that Poland issued stamps, illustrating events in Poland's early history, that were regarded by Germany as offensive, because among their designs was one showing the Polish overthrow of the invading Teutonic Knights at Grunwald in 1410. This stamp was subsequently withdrawn by the Poles in an effort to calm an atmosphere that was rapidly becoming hectic.



Polish history has been well illustrated in the stamps issued since the establishment of the Republic in 1918, and suitable selections for our collection can be made without difficulty. The portraits of the several Presidents certainly should be included, commencing with that of the great pianist-politician Paderewski, which appeared on the 15f. value of the 1919 issue. The Polish stamp illustrated here is the scarlet 30 gr. of 11th November 1933, which commemorated the 15th anniversary of the proclamation of the republic.

A Polish stamp of special interest just now is the 1 gr. value of the 1925-26 issue, which shows a view of the Holy Gate at Vilna. This provides an interesting link with Soviet activity following the German attack on Poland. Russia has compelled the North Baltic states to make various territorial concessions, and some return has been made to Lithuania by the cession of Vilna, which formed part of the Polish territory occupied by Soviet troops. The history of this city probably is as stormy as that of any in Europe. It was part of Lithuania up to 1444, and then of the combined kingdom of Lithuania and Poland until 1655, when Russia captured it, only to be driven out by Sweden in 1702. It became Russian again in 1788, and remained so until the war of 1914-18, when it was overrun by the Germans. When the Republic of Lithuania was created by the League of Nations in 1919, Vilna was included as the capital city, but the Poles captured it in 1920. The territory has always contained a big Polish population. The stamp reproduced on this page, which shows the National Assembly at Vilna, was issued in February 1922, when Central Lithuania was in Polish occupation, but not then united to Poland.



At the moment of going to press Russian efforts to secure territorial concessions from Finland are still being pressed. It seems desirable to include another chapter in our stamp story of the war to cover this, for Russian moves in the Baltic and elsewhere certainly have checked Germany's attempts at expansion eastward. The example of a Finnish stamp included here is a Red Cross issue of 1932.

Stamp Gossip

and Notes on New Issues

The Introduction of Printing in America

The most interesting of the many new issues of recent weeks commemorates the introduction of printing to the American continent. This event took place in Mexico City in 1539, and in celebration of it Mexico has issued six stamps, three for general use and three for air post. The design of the 12c. stamp of the general issue shows Archbishop Juan de Zumarraga, who brought a printer named Giovanni Paoli from Seville in Spain. The 5c. shows the house in which Paoli's plant was established, and the 10c. bears a portrait of Antonio de Mendoza, who was then Viceroy. The three air issues show specimens of early printing.



Exactly 100 years passed before the British settlements in North America possessed a printing machine. The United States has now issued a 3c. commemorative bearing the dates 1639-1939 and, as our reproduction shows, a picture of that old hand-press.

It is just coincidence that Hungary should have produced at this time a Protestant commemorative series, including on the 10f. value a portrait of Gaspar Vizsoly, printer of the Szent bible, but the stamp provides a happy link with the Mexican and U.S. commemoratives.

Panama Canal Commemoratives

The 25th anniversary of the opening of the Panama Canal in 1914 has been commemorated by the issue of a special stamp, illustrated here, showing a freighter steaming through the Gaillard Cut and portraits of President Theodore Roosevelt and General George Goethals. Theodore Roosevelt, uncle of the present President, was President of the United States in 1907, when the construction of the Panama Canal was started. General Goethals was President Roosevelt's choice as Chief Engineer of the project, which he carried through to success. He was appointed first Governor of the Canal in 1914.



The anniversary was also the occasion of the issue of a commemorative series of 16 stamps from the Canal Zone itself. The designs show eight of the most important sections of the Canal, before and after its construction.

The Republic of Panama also has commemorated the occasion by issuing nine general and eight air stamps, a total of 17 special stamps. The designs include views of the canal and portraits of the principals in the project. The most interesting portrait is that of Ferdinand de Lesseps on the 50c. air stamps. De Lesseps was the French engineer of the Suez Canal, who also acted for the French Company that was given the first concession to build the canal in 1876.

The Origin of Baseball

We illustrate here the special 3c. stamp issued by the U.S.A. to commemorate the centenary of baseball. Even the Americans are not sure of the origin of the game. It is usually attributed to Abner Doubleday, who is credited with introducing it at Cooperstown, New York, in 1839, but there is a reference to what is undoubtedly a form of the game in Jane Austen's "*Northanger Abbey*," published in 1818.

As our illustration shows, the game had a humble origin on village greens and school playing fields, and the choice of a typical schoolboy game for the design was a flash of inspiration. It would have been so easy and so understandable had the designer chosen to show one of the vast arenas in which the big league games are played.

High Prices for Rare "Entires"

In our article last month we explained the fascination of a collection of stamps remaining on their original covers. In this connection it will be of interest to know that a collection of the stamps of the Old German States on covers, or "entires" as they are usually known, was recently sold by auction for £6,500 at the Bond Street Stamp Auctions in London.

We thank Stanley Gibbons Ltd. for their courtesy in loaning the stamps from which the illustrations for our stamp pages have been made.

New Dinky Toys

The most notable addition this month to the range of Dinky Toys is a splendid scale model of Gardner's M.G. Record Car (Dinky Toys No. 23p). This was first announced in the September "*M.M.*" but production has been unavoidably suspended until now. Readers will remember that this car is a reproduction of the one in which Major A. T. G. Gardner set up new world speed records for cars up to 1,100 c.c. on the Bitterfeld-Dessau Autobahn, Germany, in May this year. His speed for the flying kilometre was 203.7 m.p.h., and for the flying mile 203.2 m.p.h. After having the engine rebored to increase its capacity, Major Gardner set up new records for cars up to 1,500 c.c. over the flying kilometre, mile and five kilometres, with speeds of 204.2 m.p.h., 203.8 m.p.h., and 200.6 m.p.h. respectively.

Another new item this month is the Searchlight Lorry (Dinky Toys No. 22s). This is a four-wheeled motor lorry on which is mounted a swivelling and elevating searchlight. The Searchlight Lorry is enamelled in Service green and forms an interesting addition to the existing range of Dinky Toys Mechanised Army equipment.

A Pioneer British Aircraft Firm—

(*Continued from page 685*)

Australia in 15½ days. In recognition of this fine achievement he was awarded the Air Force Cross and was made an honorary squadron leader of the Royal Australian Air Force. Hinkler was killed in January 1933 while attempting to set up a new record for a flight from England to Australia, and it was not until May of that year that the wreckage of his machine was found on the lonely slopes of a mountain in the Apennines. The 1928 record held for nearly three years, and then was broken by another "Avian" with a more powerful engine, when the late Sir Kingsford Smith flew from England to Australia in 10 days. In 1930 an "Avian" piloted by Miss Winifred Brown won the King's Cup Air Race, this being the only occasion on which the race has been won by a woman.

In 1929 a development occurred that was to have a marked effect on the design of future Avro aircraft. This was the production of the Avro "Ten," a high wing commercial monoplane based on the Dutch Fokker F.VII-3m, of which the manufacturing rights had been bought. The Avro "Ten" had a welded steel fuselage and unbraced cantilever wooden wings; it carried eight passengers and a crew of two. After a great deal of research the company decided that as far as practicable all future Avro aeroplanes should have welded steel tube fuselages, and that commercial aircraft should be monoplanes incorporating the same method of wing construction that had been employed in the Avro "Ten" machine.

Another interesting event in 1929 was the decision of the Air Ministry that the Avro 504J, which for 12 years had been the standard type of training aeroplane, should be replaced by something more modern. The Ministry selected the new type by means of a competition, in which the Avro company submitted a new biplane, type 621, fitted with a Siddeley "Mongoose" engine. The competition lasted nearly three years, and during that time the Air Ministry tested every conceivable type of aeroplane, with engines ranging from 100 h.p. to 200 h.p., for long periods under actual Service conditions at R.A.F. flying training schools. Ultimately the Avro 621, now fitted with a Siddeley "Lynx" engine, was selected and standardised as the new training aeroplane of the R.A.F.

In 1933 the Avro company introduced the type 642 high wing monoplane, a very economical medium-sized transport. It was virtually a development of the "Ten" monoplane, with practically the same wing, and a longer fuselage so that 16 passengers and a crew of two could be carried. The design was so arranged that, if desired, four Siddeley "Lynx" engines could be installed, and an Avro 642 with these engines was supplied to the Government of India for the personal use of the Viceroy.

Later in the same year the Avro 652 was built to the special order of Imperial Airways. It is of interest as being the first low wing monoplane produced by the Avro company, and the first of their aircraft to have a retractable undercarriage.

An important development of this machine was the Avro "Anson" coastal reconnaissance aeroplane, adopted by the Air Ministry in 1934. The fuselage of the "Anson" differed from that of the Avro 652, and was specially designed for the military duties that the aeroplane would have to perform. The "Anson" carries a crew of three, one of whom is alternately navigator and bomb-aimer, and another alternately radio operator and rear gunner. When the expansion of the R.A.F. began in 1935 large numbers of "Ansons" were ordered.

To-day Avro "Ansons," "Tutors," and 626s are still being turned out in large numbers to meet the demands for these aircraft. The two last-mentioned types are in use in 19 Air Forces, and are built under licence in seven countries.

Charles Letts's Diaries for 1940

The very popular diaries produced by our advertisers Charles Letts and Co. cover a wide range, almost every hobby, sport and pastime having one providing for its individual needs. There has been no increase in prices in spite of the outbreak of war, and the standard of quality is fully maintained.

The "*Schoolboy's Diary*" is the one that will appeal specially to most of our readers. It contains a well-arranged diary portion, with ample room for entries, and there are over 60 pages of useful information. The price in cloth is 1/3, and it is available in leather cloth with pencil and maps at 1/6, and in leather, with pencil, pockets and maps at 3/6.

For older readers there is the "*Public School's Diary*," which is similar, but contains more advanced general information than the "*Schoolboy's Diary*" and is published in the same bindings at the same prices.

The "*Boy Scout's Diary*" is small and handy, and contains sections on patrol signs, knots, camping and other topics in which a Scout is interested. It is published in various editions at 9d., 1/–, 2/6 and 5/–.

Lett's diaries can be obtained from stationers in all parts of the country, but readers who have any difficulty should write to Charles Letts and Co., Diary House, Borough Road, London S.E.1, mentioning the "*M.M.*"

Skybirds in Wartime

The outbreak of war has given added interest to model aeroplane construction, and the assembly of the Skybird models of our advertisers A. J. Holladay and Co. Ltd. will provide very attractive occupation for the dark winter evenings. The Skybird League was formed seven years ago for the benefit of Skybird modellers. It holds an Annual Rally and Model Competition, and all modellers should keep in mind the seventh of these, which is to take place about Easter next year. Now is the time to plan and begin to construct prize winning models in this competition, full particulars of which can be obtained from the Skybird League Headquarters, 3, Aldermanbury Avenue, London E.C.2.

Our advertisers also cater for ship model enthusiasts, with a new series of cast waterline scale models. A price list and full details can be obtained on sending 1½d. in stamps to A. J. Holladay and Co. Ltd., 3, Aldermanbury Avenue, London E.C.2. The "*M.M.*" should be mentioned when writing.



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HARRAP

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C. WALTER HODGES, famous young artist, has written and illustrated the boys' book of the year. He has retold one of the greatest adventures of all time—the story of Columbus' first voyage of exploration—so vividly that one seems actually to sail with him in the "Santa Maria" into the unknown. And he has illustrated the story magnificently. Definitely a book *you must have. Wonderful value for 7s. 6d. net.*

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BELL *of all Booksellers.*

FIRESIDE FUN

MASTERS OF ART

Artist: "With one stroke I can make a smiling face sad!"
Sam: "So can our form-master!"

* * * *

Policeman (to motorist): "Why didn't you slow down? Didn't you see the notice—'Slow down here'?"
Motorist: "Yes, but I thought it was describing your village."

* * * *

Mr. Brown: "Did you tackle Jones about his dog barking at night?"
Mr. Smith: "Oh! yes."
Mr. Brown: "He's buried the hatchet?"
Mr. Smith: "No, buried the dog."

* * * *

The following was recently seen, written on the walls of a railway carriage:
"If £5 you can afford, try your strength and pull the cord."

* * * *

The Headmaster had spoken long and earnestly to the school about the forthcoming examinations. He concluded: "I want you all to do your best, if only for the sake of the dear old school. You have not long to wait now, as the examination papers are in the hands of the printer. Now, are there any questions?"
"Who's the printer, sir?"

* * * *

Mutt: "It's an old car, but it's sound."
Butt: "Yes, I noticed that when driving it; everything makes a noise except the hooter."

* * * *

"Hey, Bill, wot are you doin' nowadays?"
"Got a job as an engineer."
"Like it?"
"Bit fiddlin'. Got to make fings to a fousandth of an inch."
"Lumme! How many fousandths are there in the inch?"
"Oh, millions!"

* * * *

"Please, sir, will you explain the following: 'A nod is as good as a wink to a blind horse'."
Professor: "A slight inclination of the cranium is as adequate as a spasmodic movement of one optic towards an equine quadruped devoid of its visionary capacity."

* * * *

Vendor: "Did you find the alarm clock we sold you satisfactory?"
Customer: "Rather! It wakens the parrot; the parrot whistles to the dog; and the dog barks till we wake up."

* * * *

THE FOOT-PATH



Heavy Stranger, returning to his seat after the interval: "Did I tread on your toes as I went out?"
Seated man grimly: "You did, sir."
Heavy Stranger, to wife: "That's right, Matilda, this is our place."

* * * *

Tourist: "What are the principal sights here?"
Native: "For tourists, the Falls. For us natives, the tourists."

* * * *

Scoutmaster: "Have you done your good turn to-day?"
Scout: "Well, sir, there was one dose of castor oil left, and I gave it to my younger brother."

TIT FOR TAT

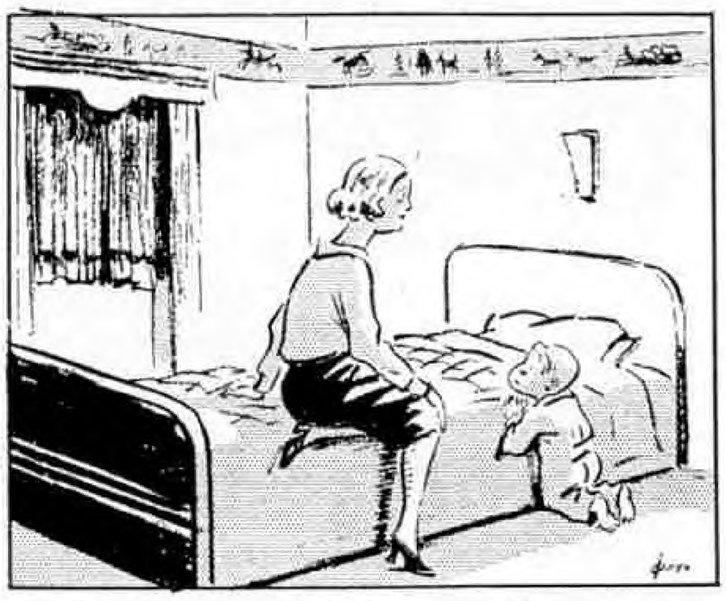
Waiter: "This half-crown isn't a good one!"
Customer: "Well, neither was the dinner!"

* * * *

"Pass the lump sugar, please."
"We haven't got lump sugar. Here's the granulated, and if you don't like it you can lump it."

* * * *

RUN OUT OF FUEL!



A little boy was saying his prayers. He got half-way without difficulty, and then there was a long pause.
"Go on," said his mother.
"I can't," came the reply, "I've conked out."

* * * *

"Can I help you, madam?" asked the ground-floor manager of the city store.
"Oh, thank you. Will you just say some of the things you sell? I know I want to buy something, but I can't remember what it is."

* * * *

Father: "Have you seen my shaving-brush, Willie?"
Willie: "No, father; but Jimmy's wooden horse has got a new tail this morning."

* * * *

"What's that piece of string tied round your finger for, Bill?"
"That's a knot. Forget-me-not is a flower, with flour we make bread, and with bread we eat cheese. This is to remind me to buy some pickled onions."

* * * *

Rich Old Uncle: "Algernon, I'm going to make my will. I think I shall leave you——" (pause).
Expectant Nephew (eagerly): "Yes, uncle?"
Uncle (resignedly): ". . . . . before long."

* * * *

A certain pompous member of an Education Committee entered a school one day determined to put the children through their paces. "What is the capital of 'Olland?" he began. One bright-looking lad immediately put up his hand. "Please, sir, 'H!'"

* * * *

Sam: "What do you think of a man that throws a banana skin on the footpath?"
Tom: "I don't know. What do you think of a banana skin, that throws a man on the footpath?"

* * * *

Old Lady (seeing barrage balloons for the first time): "Well, well—I always wondered where those airmen lived when they stopped flying about!"

* * * *

First Cruise Enthusiast: "What's the best cure for sea-sickness?"
Second Ditto: "Give it up."

* * * *

First Scout: "What is the difference between ammonia and pneumonia?"
Second Scout: "Search me!"
First Scout: "Ammonia comes in bottles and pneumonia comes in chests!"

* * * *

THIS MONTH'S HOWLER

"A Prime Minister is a clergyman who is just in the middle of his career."

IN THE SOUP

Caller: "Can I see Mrs. Brown?"
Maid: "I'm sorry, but Mrs. Brown can't see you now. She's in the middle of her soup."

* * * *

Johnny: "Grandpa, can you help me with this sum?"
Grandpa: "I could, my boy, but it wouldn't be right, would it?"
Johnny: "I don't suppose it would, but have a shot at it, grandpa."

* * * *

Mr. Black: "Tell them all you know. It won't take long."
Mr. White: "I'll tell them all we both know. It won't take any longer."

* * * *

An elderly professor hurried into the police station and approached the sergeant.
"Officer," he stormed, "I have been robbed of my gold watch."
"Oh," said the sergeant, "when did this happen?"
"As I was getting off the tram," said the old man.
"But didn't you feel a hand in your pocket?" asked the sergeant.
"Yes, now you come to mention it, I did," replied the other; "but at the time I thought it was my own."

* * * *

Father: "Why is it that you are always at the bottom of the class?"
Johnny: "It doesn't make any difference, daddy, they teach the same things at both ends."

* * * *

A boy had been fishing for four hours when an inquisitive man came along and inquired what he was doing.
"Fishing," was the boy's reply.
"Got anything?" asked the man.
"Yes," came the reply.
"What?"
"Patience," said the boy.

* * * *

Clerk: "What name, please?"
Caller: "Fitz-Brown."
Clerk: "Will you spell it, please?"
Caller: "F-I-T-Z B-R-O-W-N with a hyacinth in between."

* * * *

A Cockney soldier sucking a clay pipe kept ducking whenever a shell burst, and finally the major shouted:
"What do you keep ducking for, man! A shell won't hurt you."
"Lummy I know that!" said the Cockney. "But this 'ere pipe is the only one I've got!"

* * * *

"Didn't I shave you about a fortnight ago, sir?"
"No; I got that scar in a motor crash."

* * * *

Sandy: "Why did the foreman sack you, Simpson?"
Simpson: "Well, a foreman is one who stands around and watches his men work."
Sandy: "I know, but what's that got to do with it?"
Simpson: "Why, he got jealous of me, people thought I was the foreman!"

* * * *

THE SECOND ROUND



Stout Lady on weighing machine: "What! Only eight stone! It's out of order."
Husband: "No! It's quite right Martha, that's the second time round!"

* * * *

Smith (Jones' boss) was paying a visit to his employee.
"Did you come in your slave?" asked little Willie.
"What do you mean, son?"
"Oh, I heard dad say you were a slave-driver."

* * * *

Defending Counsel: "You say that the wall is eight feet high and that you were standing on the ground. Then perhaps you will explain how you, a man a little over five feet, could see over the wall and watch the prisoner's actions."
Witness: "There's a hole in the wall."

* * * *

Customer: "But surely you don't sell these watches for five shillings each?"
Jeweller: "Oh, yes, madam."
Customer: "But they must cost that to make!"
Jeweller: "They do, madam."
Customer: "Then how do you make a profit?"
Jeweller: "By repairing them."

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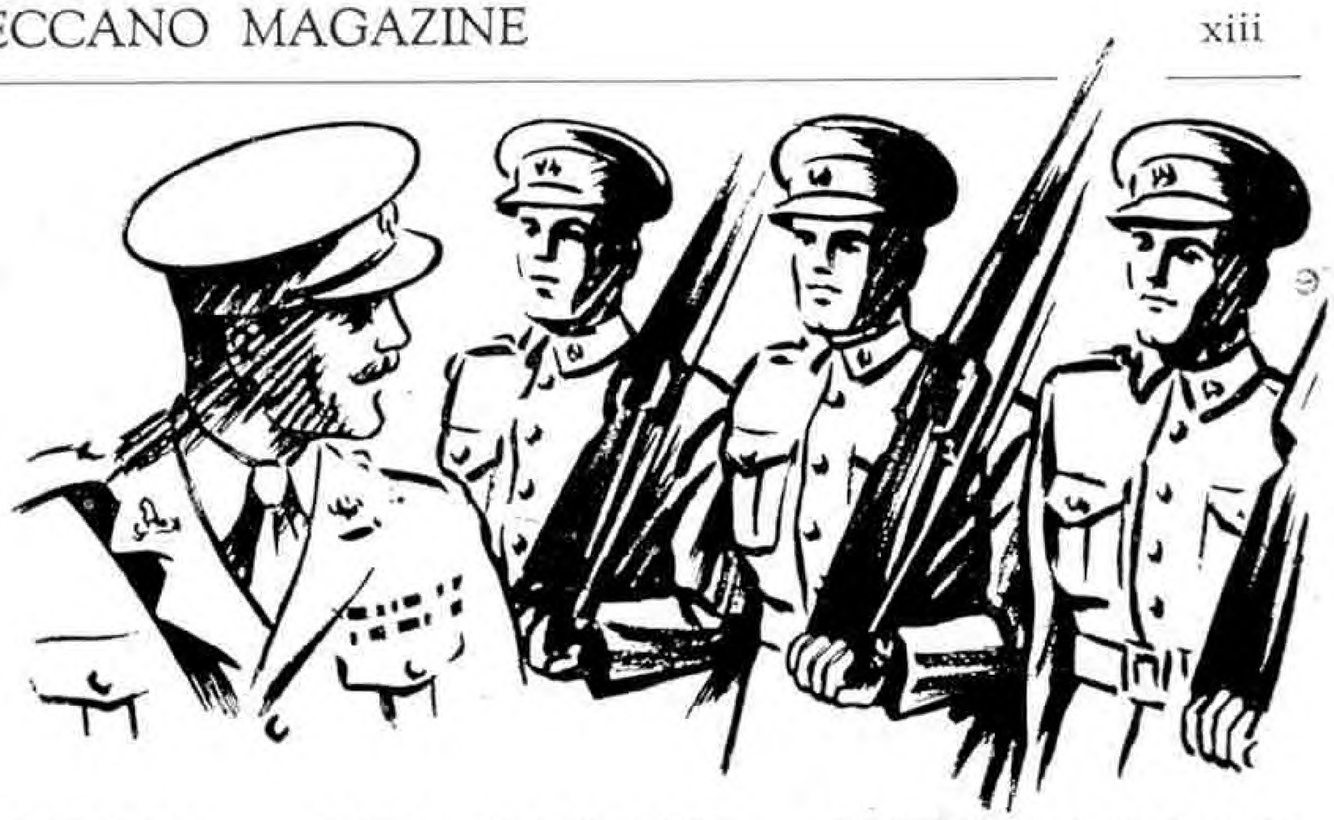
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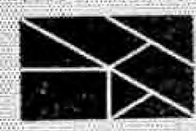


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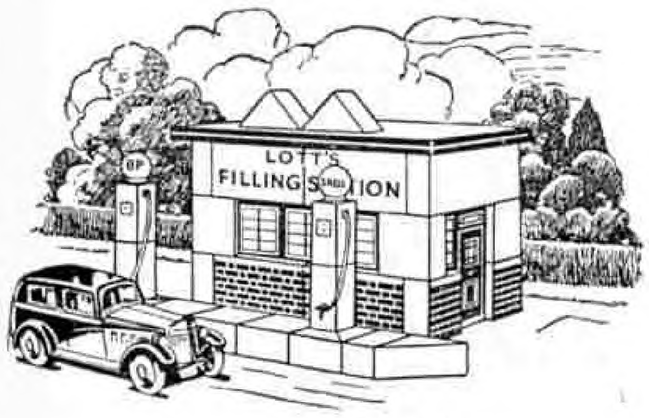


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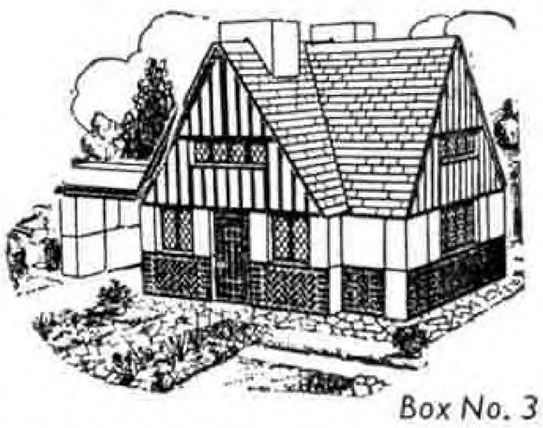


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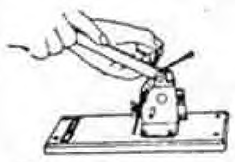
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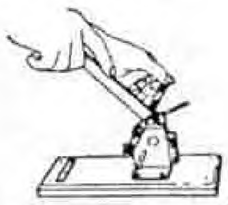
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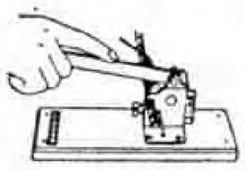
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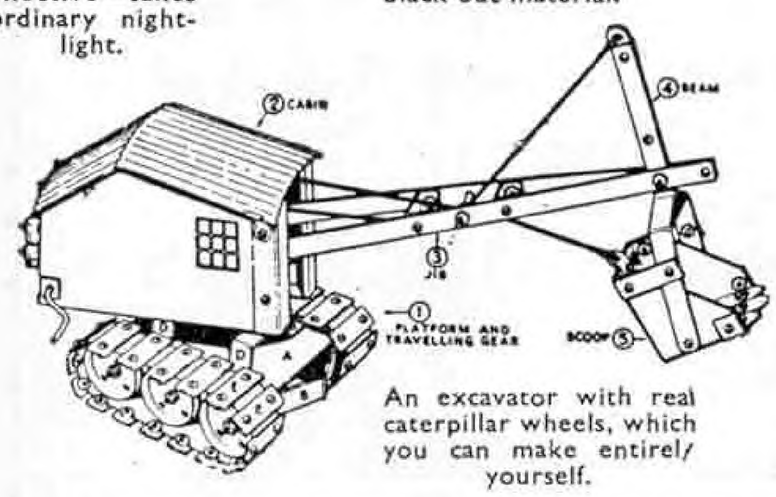
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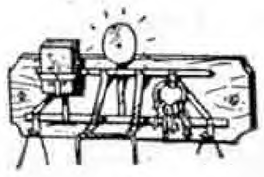


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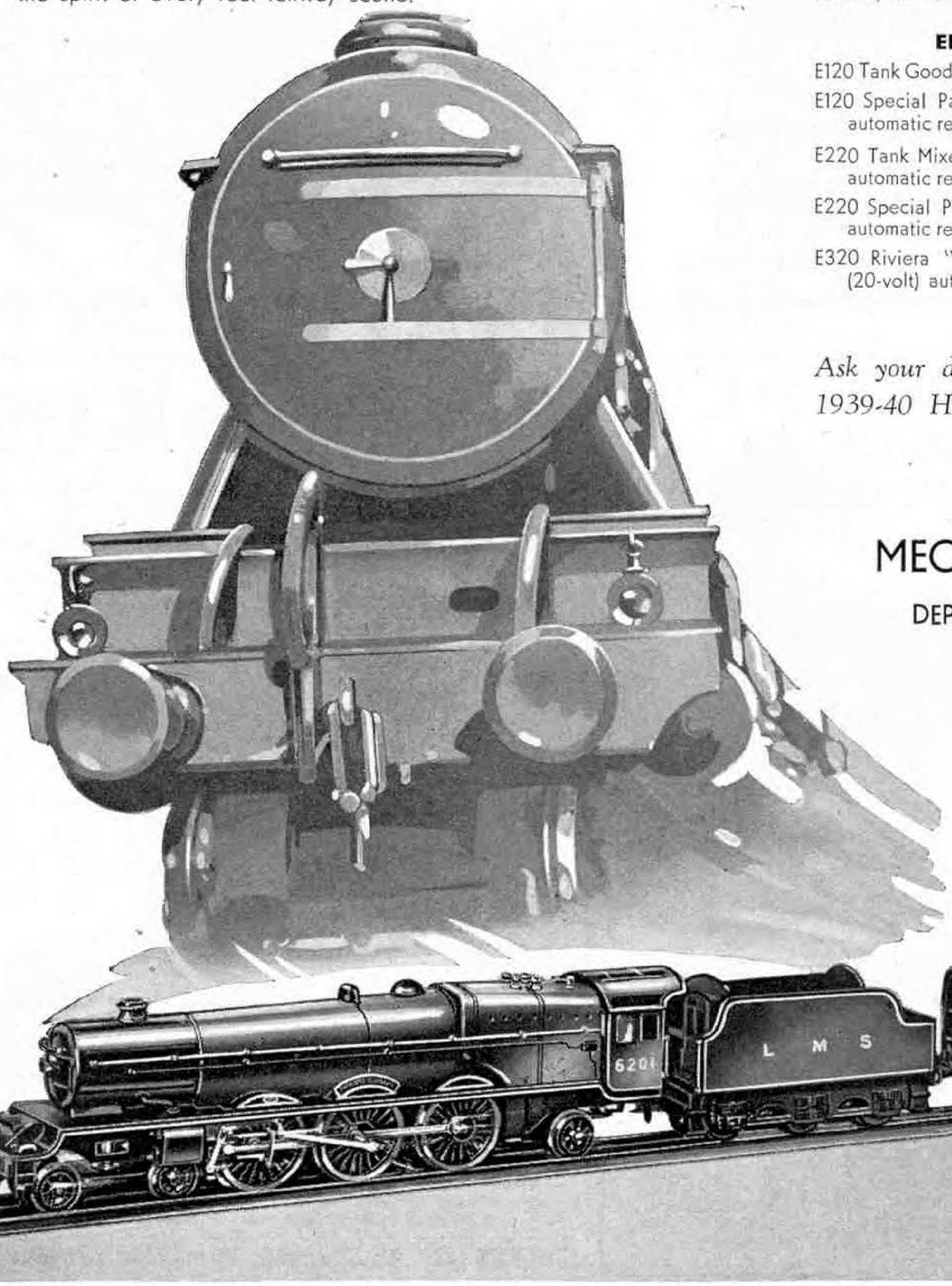
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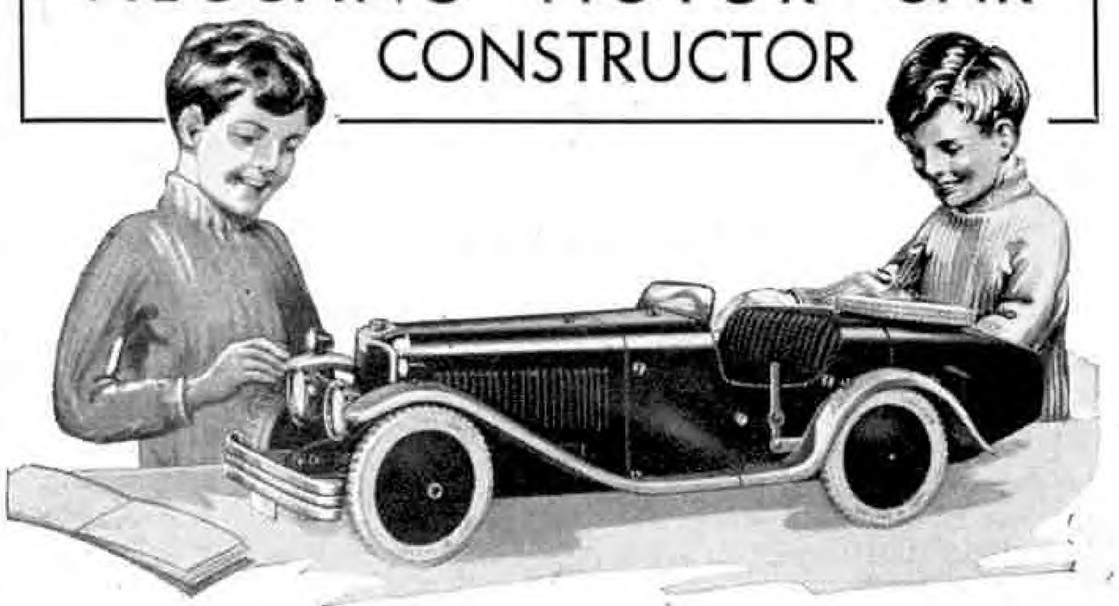
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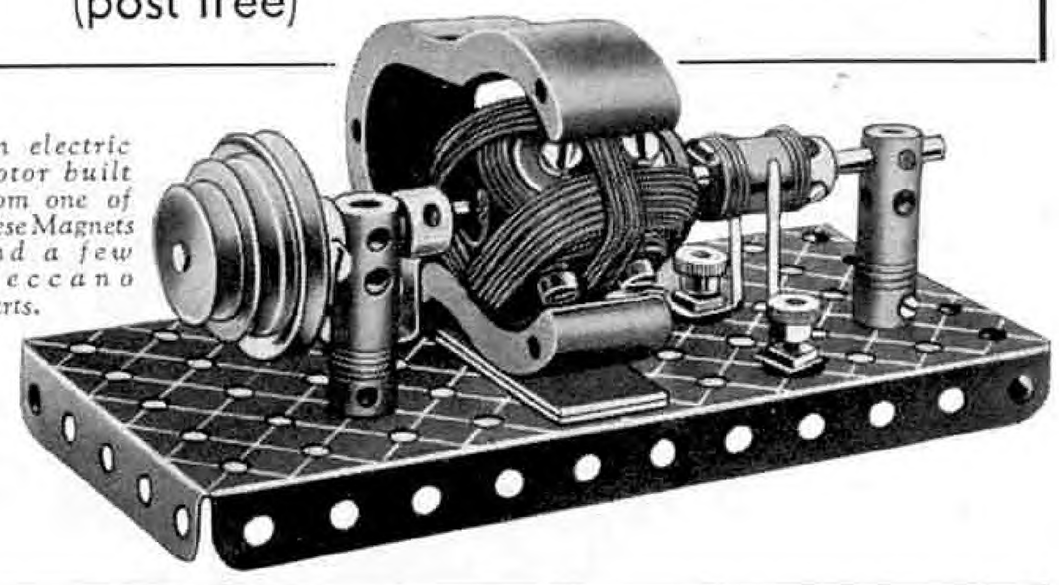


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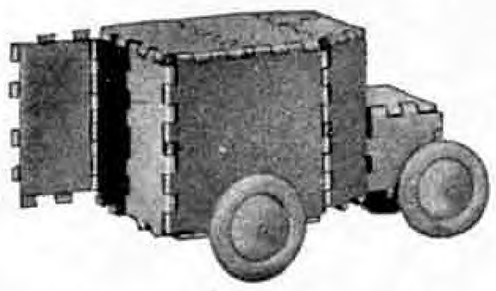
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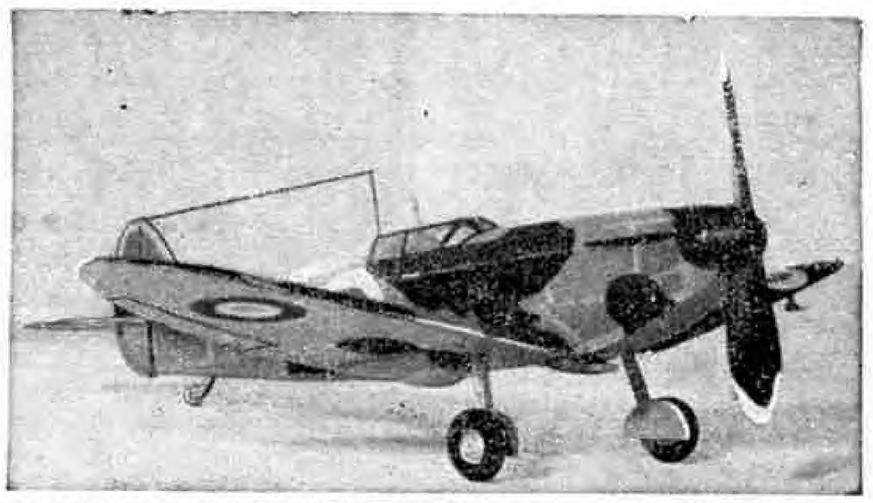
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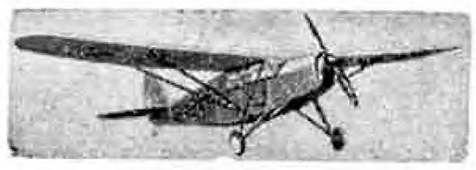


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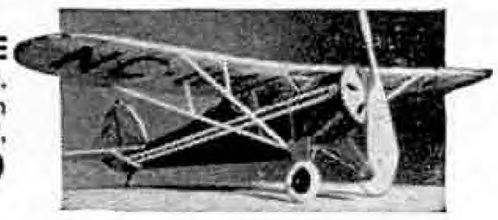


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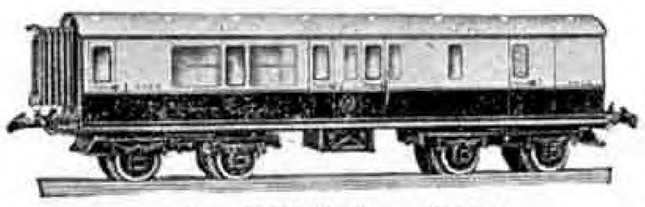
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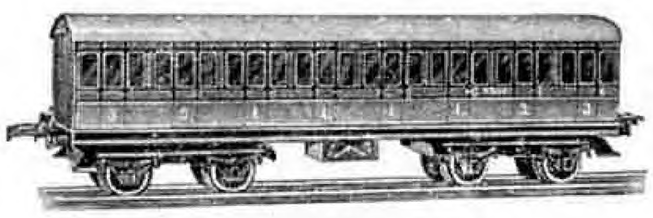
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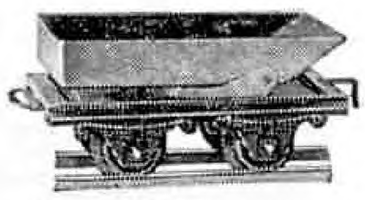
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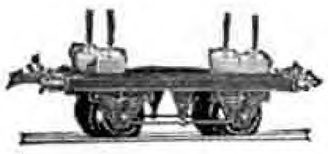
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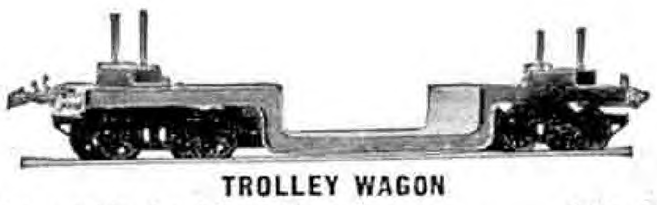
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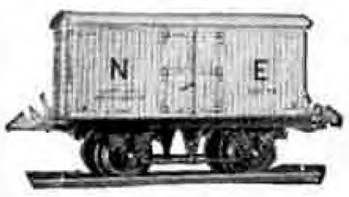


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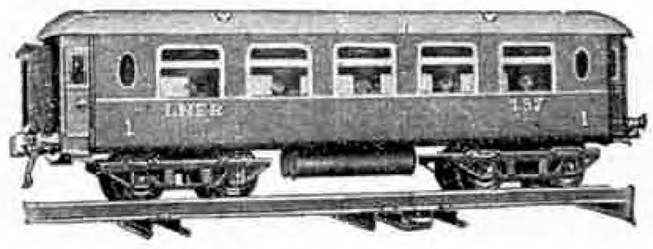
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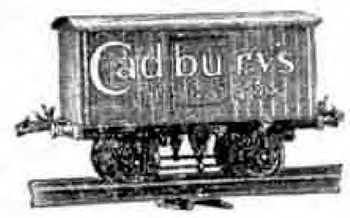
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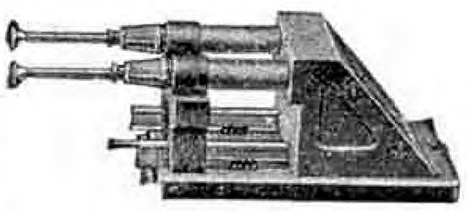
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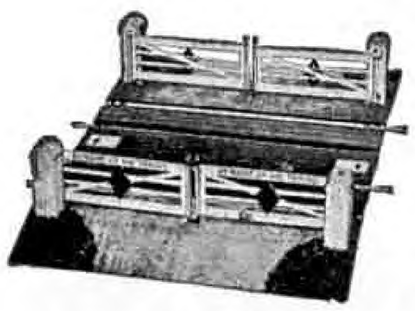
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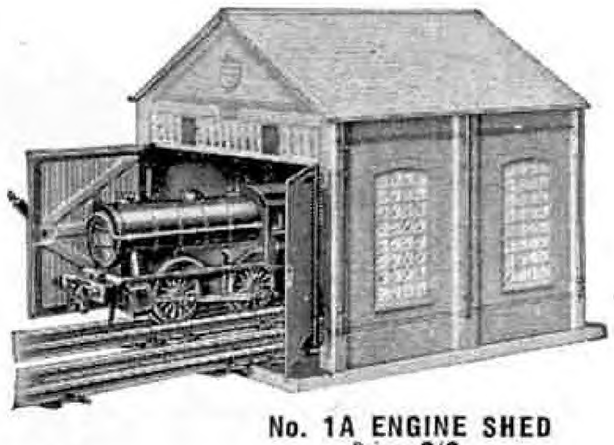
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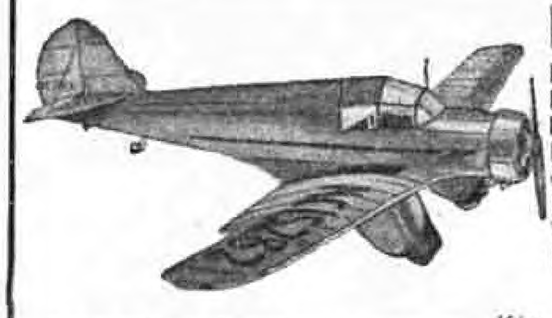
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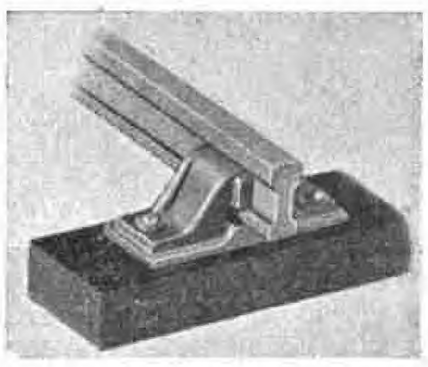
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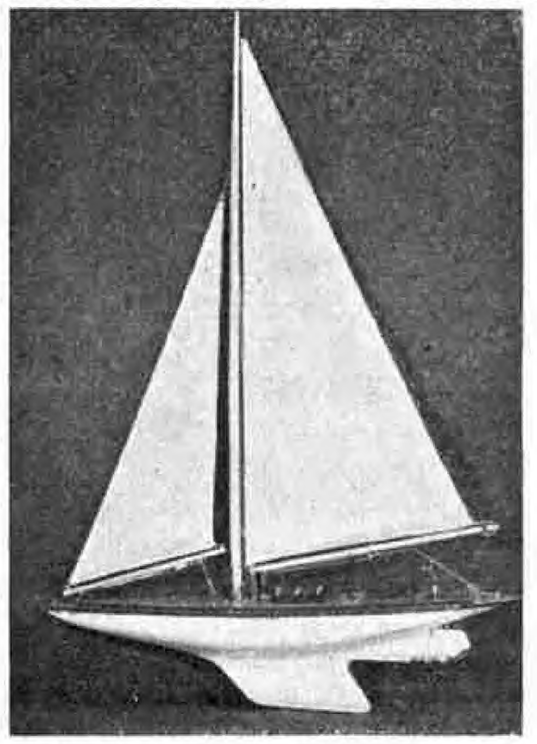
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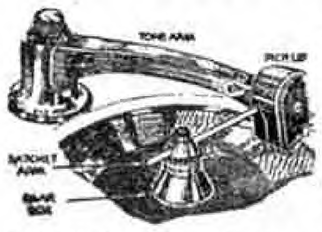
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READERS' SALES AND WANTS

Readers should note that all advertisements of Hornby Trains and other Meccano products included in this column relate to items no longer featured in the catalogue. Advertisements of current products cannot be accepted for this column.

"Meccano Magazines," September 1926 to August 1939. Good condition. 50/- or nearest offer.—Bell, 101, Lynton Road, Acton, London.

For 00 Gauge—Station, 8/-, Platform, 2/-, both 24 inches long; Goods Depot, 5/6; Signal Cabin, 2/-. All as new.—Warrington, Letham, Bearsden, Glasgow.

Complete Set of Trix Trains consisting of Transformer and Controller, one Tank Engine and Continental Express and Rails, £5. Reply—Shaw, Penmorfa, Portmadoc.

Red-Green Meccano (cost 50/-) and No. 2 Clockwork Motor. Partitioned Container. 30/- or nearest.—Long, 5, Katharine Street, Millom, Cumberland.

Exchange 25 or 50 Stamps.—Ronald Homan, 3, Croxteth Hall Lane, Liverpool.

For Sale. Complete Trix Railway, good condition. £4, or nearest offer.—Chivers, Wood House, Impington, Cambs.

"M.M.'s" June 1932–Oct. 1937. Condition as new. 12/6 lot. Carriage paid.—Mills, 110, Kingswood Road, Goodmayes, Essex.

Bowman Engine M122, Dynamo M.839. Halfprice each. "M.M.'s" 1933–35–36. 2/- per year. Clockwork Motor. Halfprice. Information from—Eaton, "Cables," East Ogwell, Newton Abbot.

Sale. Red/Green Meccano, excellent condition. Cost £4. Take £2/2/-. Send for list. 65 "M.M.'s," May 1932 to November 1937; three missing, 7/6.—B. Irving, 81, Gargrave Road, Skipton, Yorks.

L.M.S. 0-6-4 Clockwork Tank Locomotive. B.L. Best Quality Mech. Take 27/6. Details—Payne, 39, Revell Road Kingston, Surrey.

Cinema Films, small reels of 16 mm. and 9.5 mm.—R. Hobbs, 83, Curling Crescent, King's Park, Glasgow.

For Sale. Quantity of T.T.R. Track, Remote Control Points, and "Pacific" Locomotive. Cost £11 complete. Sell for £6 or separately.—T. B. Owen, Lenzie, Aberystwyth.

For Sale. "M.M.'s" Jan. 1930–Dec. 1937. Perfect condition. Any offer. Apply—West, 55, Montague Road, Hounslow.

Sale. "Frog" Hawker Hart Biplane. Cost 42/-. Take 15/-.—109, Westerham Road, Keston, Kent.

Stamps. Send 50/100 different. Same number sent in exchange. Enclose stamped envelope.—Morgan, Bell Croft, Southowram, Halifax.

Wanted Steam Loco, Traction Engine, Steam Models.—Neesom, 11, Rushford St., Longsight, Manchester 12.

Sale. Album containing 225 Railway Postcards. Cost £2. Accept 25/-.—Vincent, 11, Beverley Road, Ipswich.

Films. Few 100 ft. lengths 35 mm. Standard Films. Cowboys, Comics, etc., 1/6 each, post 4d.—R. Hobbs, 83, Curling Crescent, King's Park, Glasgow S.4.

Sell Brand-new unused 30/- 620 Daylight Developing Tank, perfect, 21/- or reasonable offer.—Blake, Ashcombe Road, Dorking.

Sale. Gauge 0 Model Railway Accessories. Meccano Magazines. Stamps, etc. Write for list.—Armstrong, 1, Aglionby Street, Carlisle.

Meccano Red/Green, includes Motor, Transformer; cost over £10/10/-; approval against cheque; 95/- for quick sale.—Yates, Dentist, Fallings Park, Wolverhampton.

Gauge 0 Clockwork Railway. 60 ft. Track. 3 Engines. Cost over £4. Sell for 30/- or nearest.—Whyman, 20, Hulmes Road, Failsworth, Manchester.

Sale. Gauge 0 Bassett-Lowke D.C. Permanent Magnet type Electric Loco, Electric Railcar, Rails, Points and Rolling Stock. £3 or nearest.—Spivey, Thornroyd, Heckmondwike, Yorks.

Complete Gauge 0 Electric Railway, 45/-; 100 "Modern Wonders," 7/6.—Stevens, 70, Chittys Lane, Dagenham.

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EDITORIAL AND ADVERTISING OFFICE:—
LIVERPOOL 13, ENGLAND.
Telegrams: "Meccano, Liverpool."

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To Contributors. The Editor will consider articles and photographs of general interest and payment will be made for those published. Whilst every care will be taken of articles, etc., submitted, the Editor cannot accept responsibility for any loss or damage. A stamped addressed envelope of the requisite size should be sent where the contribution is to be returned if unacceptable.

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Press Day, etc. Copy should be sent as early in the month as possible for insertion in following issue. We usually close for press on or before 6th of each month for following issue. Half-tone blocks up to 100 screen.

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Voucher copies. Sent free to advertisers booking one inch or over. Other advertisers desiring vouchers should add 8d. to their remittance and should order voucher copy at same time.

Remittances. Postal Orders and Cheques should be made payable to Meccano Ltd.

Ordering the "M.M." Overseas

Readers Overseas may order the "*Meccano Magazine*" from regular Meccano dealers or direct from this office. The price and subscription rates are as above, except in the cases of Australia, where the price is 1/2 per copy (postage extra), and the subscription rates 8/- for six months and 16/- for 12 months (post free), Canada, where the price is 10c. per copy, and the subscription rates 65c. for six months, and $1.25 for 12 months (post paid).

The U.S.A. price is 15c. per copy, and the subscription rates $1 and $2 for 6 and 12 months respectively (post free).

Overseas readers are reminded that the prices shown throughout the "*M.M.*" are those relating to the United Kingdom and Northern Ireland. Current Overseas Price Lists of Meccano Products will be mailed free on request to any of the undermentioned agencies. Prices of other goods advertised may be obtained direct from the firms concerned.

CANADA: Meccano Ltd., 187-189, Church St., Toronto.
UNITED STATES: Meccano Co. of America Inc., New Haven, Conn., Meccano Co. of America Inc., 200, Fifth Av., New York.
AUSTRALIA: Messrs. E. G. Page & Co., 52, Clarence Street, Sydney, N.S.W.
NEW ZEALAND: Models Limited, Third Floor, Paykel's Buildings, 9, Anzac Avenue (P.O. Box 129), Auckland. C.1.
SOUTH AFRICA: Mr. A. E. Harris (P.O. Box 1199), 142, Market Street, Johannesburg.
INDIA: Karachi: Daryanamal and Bros., Elphinstone Street. Bombay: Bombay Sports Depot, Dhobi Talao. Calcutta: Bombay Sports Depot, 2, Lindsay Street. Madras: Bombay Sports Depot, 162, Mount Road.

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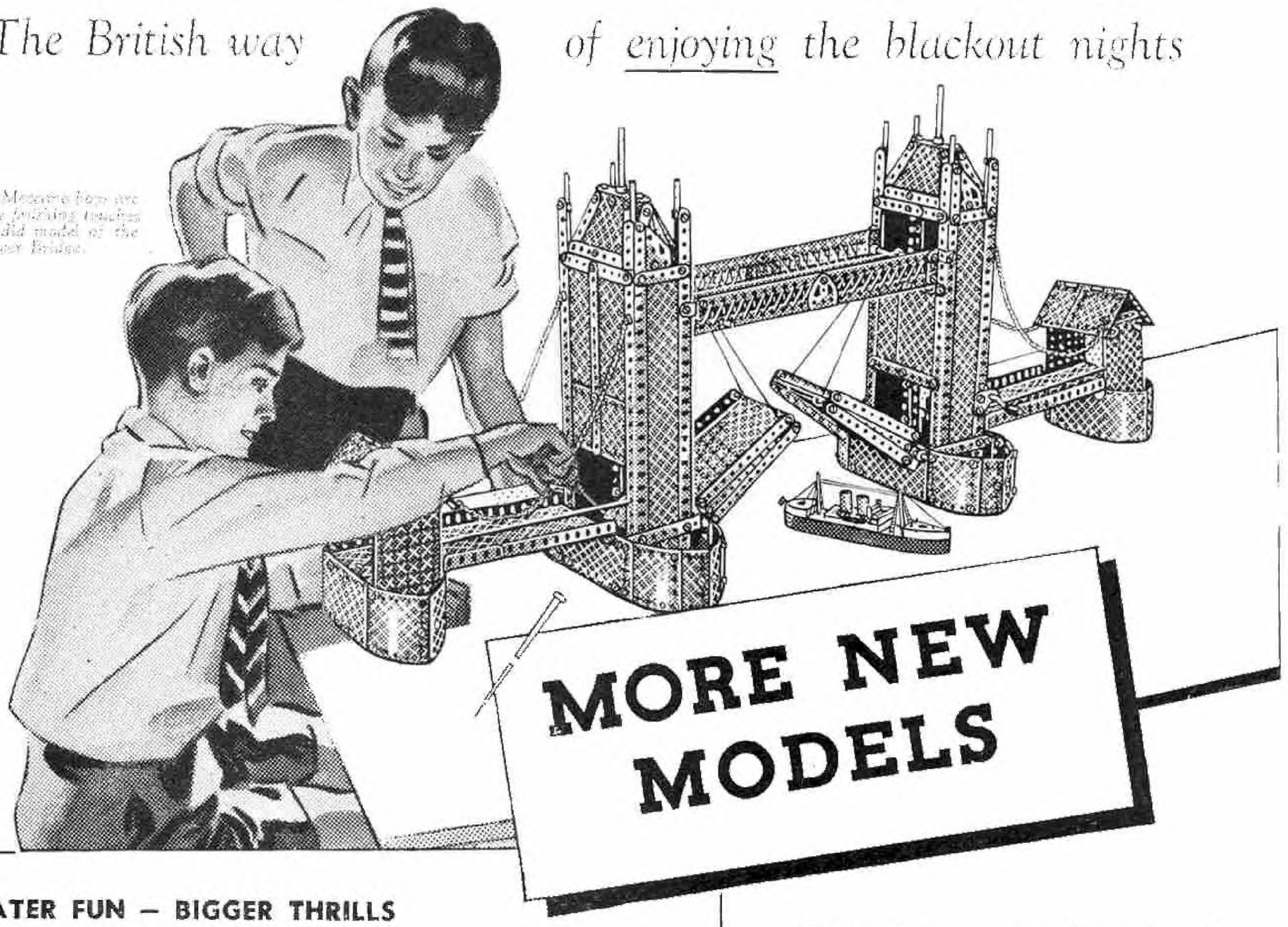
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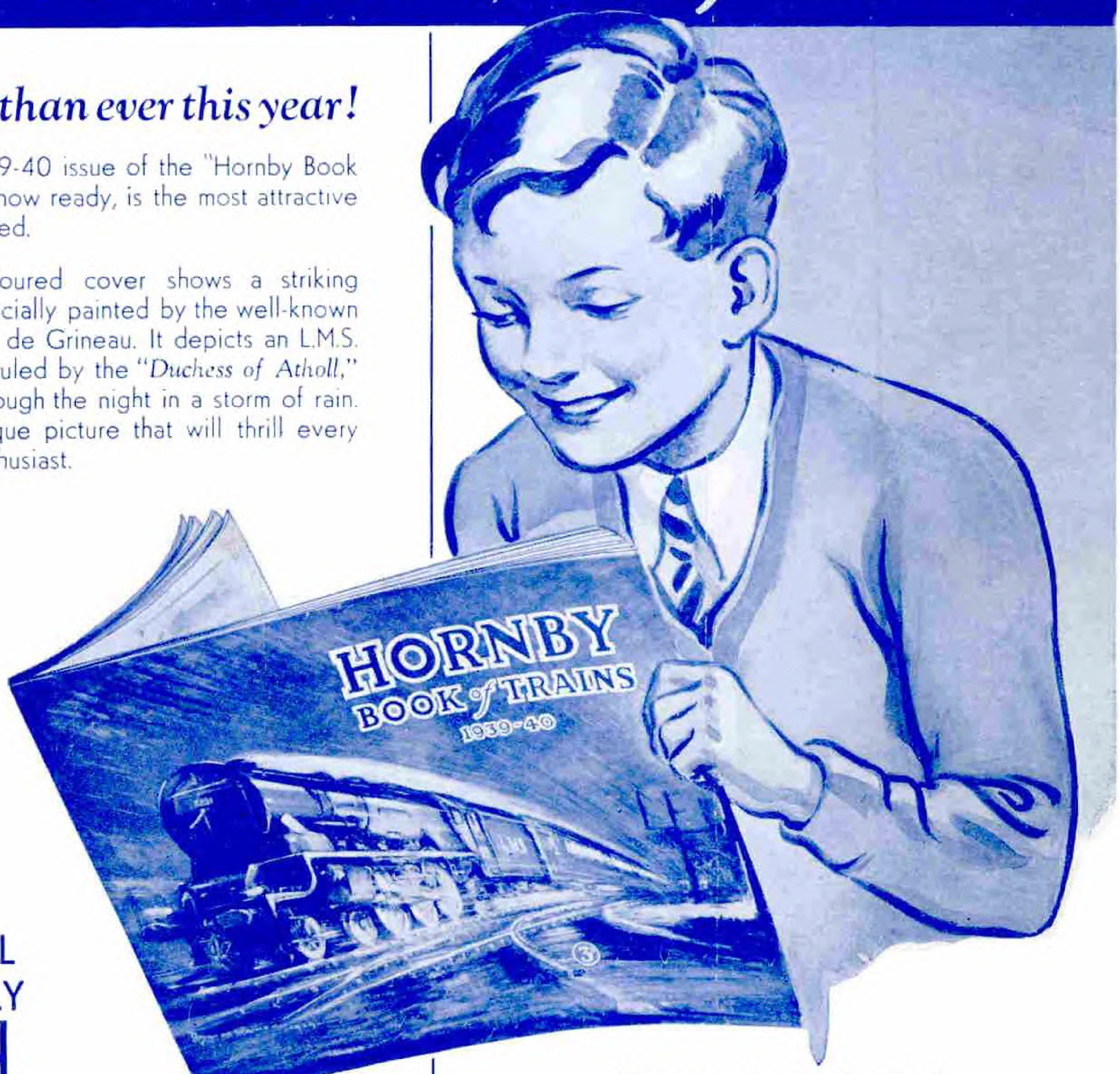
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